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ABSTRACT

This workbook, one of five volumes comprising a training program designed for educational research and development personnel, provides opportunities to practice procedures in the instructional materials development process. The exercises are based on materials presented in a series of 11 subvolumes of the handbook entitled (a) "Plan Study of Criterion Behaviors," (b) "Collect and Analyze Data About Criterion Behaviors," (c) "Sequence and Group Criterion Behaviors," (d) "State Criterion and Preparatory Objectives," (e) "Plan Simulation Based on Instructional and Logistical Needs," (f) "Develop Diagnostic and Evaluative Tests," (g) "Formulate Instructional Strategies," (h) "Plan Accommodation of Individual Differences," (i) "Develop Instructional Materials," and (j) "Evaluate Instructional Materials." (PD)

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A Technology For Developing Instructional Materials

4 WORKBOOK



AUTHORS:

Zita Glasgow

George L. Gropper

Published by:

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A Technology For Developing Instructional Materials

4 WORKBOOK

Volume Titles:

- 1. USER'S MANUAL**
- 2. ORIENTATION**
- 3. HANDBOOK**
-  **4. WORKBOOK**
- 5. FINAL EXERCISES**

AUTHORS:

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Zita Glasgow

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VOLUMES IN THIS SERIES

1. USER'S MANUAL
2. ORIENTATION
3. HANDBOOK
(eleven sub-volumes)
4. WORKBOOK
5. FINAL EXERCISES

FOREWORD

This WORKBOOK is but one of five major volumes which comprise a training program designed for educational R&D personnel. It was prepared to provide them with opportunities to practice procedures in the instructional materials development process. It contains exercises based on materials which are presented in a series of HANDBOOK sub-volumes.

The USER'S MANUAL describes the role each of the five major volumes is designed to play. It also prescribes the sequence in which each of the separate volumes is to be used. Personnel taking this program are, therefore, urged to read the instructions contained in this volume before attempting to use any of the separate volumes.

ACKNOWLEDGMENTS

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U.S.O.E. sponsorship does not in any way imply official endorsement of the views expressed in this volume.

The authors are indebted to Miss Kathleen Gubala for her tireless preparation of the complex manuscript required by this WORKBOOK.

George L. Gropper
Zita Glasgow
March 1973

INSTRUCTIONS

1. The schedule to follow in doing the exercises which appear in this volume appears in two places:
 - (a) Page 26 in the USER'S MANUAL presents an overview of the order of activities; and
 - (b) Pages (in blue) which precede each section in this volume provide a detailed order of activities to be followed in doing the exercises associated with each TASK in the development process.
2. Note two key features of the recommended schedule of activities:
 - (a) Sections in this volume which are associated with TASKS in the development process are presented in a *backward* order. Thus, Section "J" is first, "I" is second, etc. This backward order constitutes the schedule you should follow.
 - (b) Before doing each exercise in this volume, read the HANDBOOK materials which are related to it. They are identified by Sub-STEP number at the beginning of each exercise. See the example below:

After reading
Handbook for
sub-STEP(S)

B.2.1

EXAMPLE

DO
EXERCISE

1

This exercise is designed to give you practice in recognizing when it is appropriate to rely on one expert as an informant for all the types of analyses which must be performed and when it is important to seek the expertise of more than one expert.

In this illustrative case, you would read all the HANDBOOK materials describing Sub-STEP B.2.1, and then you would do Exercise #1.

3. Turn to page J.i and begin the schedule of alternating reading and practice activities identified there.

FOLD OUT THIS PAGE AND
FOLLOW THE "J" SCHEDULE INSIDE

EXERCISES FOR TASK J

	After Reading HANDBOOK Sections	On HANDBOOK Pages	Do WORKBOOK Exercises	On WORKBOOK Pages	Type of Practice
1.	J.1.4	63 - 87	1A - 1I	J1 - J19	Revising program practice problems
2.	J.1.1 - J.1.3	13 - 61	2A - 2D	J21 - J29	Identifying types of learning failure
3.	J.2.4 - J.2.5	165 - 217	3A - 3D	J31 - J43	Making program revisions based on identified weaknesses
4.	J.2.1 - J.2.3	93 - 163	4A - 4F	J45 - J59	Analyzing test results to identify learning failure
5.	J.3.1 - J.3.2	221-237	-----	-----	Field testing the instructional program

6. *WHEN YOU HAVE COMPLETED ALL THE EXERCISES IN THIS SECTION OF THE WORKBOOK,
PROCEED TO FINAL EXERCISE #1 IN THE FINAL EXERCISES VOLUME.

After reading
Handbook for
sub-STEP(S)

J.1.4 (only)

DO
EXERCISE

1

Exercises 1A-II are designed to give you practice in revising program practice problems on which students have made errors.

TURN TO NEXT PAGE FOR PROBLEMS

EXERCISE 1A

Your task is to identify by letter the practice problem which provides the most, least, and intermediate amounts of assistance to the student who has to learn to DISCRIMINATE between INPUTS.

Put a letter (A, B, or C) in each of the last three columns.

Degree of Assistance
INTER-

MOST MEDIANE LEAST

	A	B	C			
1.	The number of things is often a clue that a noun is plural. Which is plural? one girl three girls	Which is plural? cat cats	Most plural nouns have an "s" at the end; e.g., one boy - two boys. Which is plural? one dog two dogs			
2.	"Mixed" fractions have different denominators; e.g., mixed - $\frac{2}{3}$ and $\frac{1}{4}$, unmixed - $\frac{2}{3}$ and $\frac{1}{3}$. Characterize these fractions: $\frac{2}{6}$ and $\frac{1}{3}$ mixed unmixed	Check the sameness or difference of denominators in these two fractions: $\frac{7}{8}$ and $\frac{5}{8}$. The fractions are: mixed unmixed	The fractions $\frac{5}{6}$ and $\frac{5}{7}$ are: mixed unmixed			
3.	Notice where the loops are in these letters: b and d. The letters are: the same different	These letters: b and d are: the same different	The loop in this letter b is to the right. The loop in this letter d is to the left. Therefore, the letters b and d are: the same different			
4.	Observe the angles here: The number of right triangles shown is/are: one two	Any triangle with a 90° angle is called a "right" triangle. The number of right triangles here is/are: one two	The number of right triangles shown is/are: one two			
5.	See my tongue between my teeth as I say "th." When I say "f," it's different. Now listen (same sounds as in B). Are they the same or different?	(Orally presented "f" and unvoiced "th" sounds) Are these the same or different sounds?	Watch my lips and tongue as I make these two sounds (same sounds as in B). Are the sounds the same or different?			

SEE ANSWERS

ANSWERS

EXERCISE 1A

Your task is to identify by letter the practice problem which provides the most, least, and intermediate amounts of assistance to the student who has to learn to DISCRIMINATE between INPUTS.

Put a letter (A, B, or C) in each of the last three columns.

Degree of Assistance
INTER-
MEDIATE LEAST

A.			B.			C.		
MOST			MEDIATE			LEAST		
1.	The number of things is often a clue that a noun is plural. Which is plural? one girl three girls	Which is plural? cat cats	Most plural nouns have an "s" at the end; e.g., one boy - two boys. Which is plural? one dog two dogs	C	A	B		
2.	"Mixed" fractions have different denominators; e.g., mixed - 2/3 and 1/4, unmixed - 2/3 and 1/3. Characterize these fractions: 2/6 and 1/3 mixed unmixed	Check the sameness or difference of denominators in these two fractions: 7/8 and 5/8. The fractions are: mixed unmixed	The fractions 5/6 and 5/7 are: mixed unmixed	A	B	C		
3.	Notice where the loops are in these letters: b and d. The letters are: the same different	These letters: b and d are: the same different	The loop in this letter b is to the right. The loop in this letter d is to the left. Therefore, the letters b and d are: the same different	C	A	B		
4.	Observe the angles here: The number of right triangles shown is/are: one two	Any triangle with a 90° angle is called a "right" triangle. The number of right triangles here is/are: one two	The number of right triangles shown is/are: one two	B	A	C		
5.	See my tongue between my teeth as I say "th." When I say "f," it's different. Now listen (same sounds as in B). Are they the same or different?	(Orally presented "f" and unvoiced "th" sounds) Are these the same or different sounds?	Watch my lips and tongue as I make these two sounds (same sounds as in B). Are the sounds the same or different?	A	C	B		

DO NEXT PROBLEM

EXERCISE 1B

The practice problems in Column A were designed to teach DISCRIMINATIONS; but they resulted in errors.

Your task in Column B is to revise the problem by adding assistance (as little as necessary).

Your task in Column C is to develop a new item using a different example (with the amount of assistance provided being roughly comparable to that provided in the practice item you created in Column B.

A. EXISTING PRACTICE PROBLEM	B. Your Revision	C. Your New Item
1. ☐ ☐ These two figures are of: the same type X different types		
2. "Personal" tax reduction and lowered interest rates are financial measures of: the same type X different types		
3. (A baseball pitched toward the plate) Is that a: X strike ball		
4. Identify the prime number. X 13 9 neither both		
5. Are the instructions provided by these symbols X x^2 $(2x)^2$ the same X different		

SEE ANSWERS

ANSWERS

EXERCISE 1B

The practice problems in Column A were designed to teach DISCRIMINATIONS; but they resulted in errors.

Your task in Column B is to revise the problem by adding assistance (as little as necessary).

Your task in Column C is to develop a new item using a different example (with the amount of assistance provided being roughly comparable to that provided in the practice item you created in Column B).

EXISTING PRACTICE PROBLEM

1. ☐ ☐

These two figures are of:
the same type
x different types

2. "Personal" tax reduction and lowered interest rates are financial measures of:
the same type
x different types

3. (A baseball pitched toward the plate)
 Is that a:
x strike
ball

4. Identify the prime number.
x 13
9
neither
both

5. Are the instructions provided by these symbols $2x^2$ $(x)^2$
the same
x different

Your Revision

Notice the equal lengths on all four sides.
 Are these figures ☐ ☐
the same type
x different types

Distributing money to consumers and to investors differs.
 "Personal" tax reduction and lowered interest rates are:
same type x different types

The ball has to come above the knees.
 (A baseball pitched toward the plate)
 Is that a:
strike x ball

A prime number cannot be factored.
 Identify the prime number.
x 13
9
neither
both

Note that the exponent is outside the parentheses.
 Are the instructions provided by these symbols $2x^2$ $(x)^2$
the same x different

Your New Item

Notice the unequal lengths in Figure K.
 Are they of ☐ ☐ **B**
the same type
x different types

Distributing money to consumers and to investors differs.
 Lowered interest rates and government-financed housing projects are measures of:
x same type x different types

The ball has to come below the shoulders.
 (A baseball pitched toward the plate)
 Is that a:
x strike ball

A prime number cannot be factored.
 Identify the prime number.
7
11
neither
both

Note that the exponent is outside the parentheses.
 Are the instructions provided by these symbols $x^2 + u^2$ $(x + u)^2$
x the same x different

DO NEXT PROBLEM

EXERCISE 1C

Your task is to identify by letter the practice problem which provides the most, least, and intermediate amounts of assistance to the student who has to learn to GENERALIZE across INPUTS.

Put a letter (A, B, or C) in each of the last three columns.

Degree of Assistance
INTER-
MOST MEDIANE LEAST

A.

B.

C.

1. Check all plurals.

cat trees
dogs hour
boys desk

Most plurals have an "s" ending (e.g., girls, cups, toys).

Check all plurals.

cat trees
dogs hour
boys desk

These are plurals (e.g., girls, cups, toys).

Check all plurals.

cat trees
dogs hour
boys desk

2. Some plurals change a letter in the middle of a word.

Check all the plurals.

cats boxes
men babies
wine tree

Plurals can have at the end: s, ies, or es, or a letter changed in the middle.

Check all the plurals.

cats boxes
men babies
wine tree

Check all the plurals.

cats boxes
men babies
wine tree

3. Some geometric figures (squares) have four sides all equal in length.

Do these geometric figures belong to the same category?

yes no

Check the length of all four sides.

Do these geometric figures belong to the same category?

yes no

Do these geometric figures belong to the same category?

yes no

4. A, a; H, h; A, a; A, a

These are:

all the same letter
different letters

Letters can be the same even though they look different.

A, a; H, h; A, a; A, a

These are:

all the same letter
different letters

0, o; O, o; O, o; O, o.

Letters can be the same even though they look different.

These are:

all the same letter
different letters

5. "I," "he," and "she" are in the subjective case. "Me," "her," and "him" are in the objective case.

Check the pairs of pronouns which are in the same case.

he and I
him and I

Check the pairs of pronouns which are in the same case.

he and I
him and I

"Her" and "I" are not in the same case.

Check the pairs of pronouns which are in the same case.

he and I
him and I

SEE ANSWERS

ANSWERS EXERCISE 1C

Your task is to identify by letter the practice problem which provides the most, least, and intermediate amounts of assistance to the student who has to learn to GENERALIZE across INPUTS.

put a letter (A, B, or C) in each of the last three columns.

22

Check all plurals.

cat	trees
dogs	hour
boys	desk

Some plurals change a letter in the middle of a word.

Check all the plurals.

__ cats	__ boxes
__ men	__ babies
__ wine	__ tree

Some geometric figures (squares) have four sides all equal in length.

Do these geometric figures belong to the same category?

yes ☐ no ☐

A. a: A. a: A. a

These are:

all the same letter
different letters

"I," "he," and "she" are in the subjective case. "Me," "her," and "him" are in the objective case.

Check the pairs of pronouns which are in the same case.

he and I him and I

Most plurals have an "s" ending (e.g., girls, cups, toys). Check all plurals.

cat	trees
dogs	hour
boys	desk

Plurals can have at the end:
s, ies, or es, or a letter
changed in the middle.

Check all the plurals.

cats	boxes
men	babies
wine	tree

Check the length of all four sides.

Do these geometric figures belong to the same category?

	yes	no
1. The respondent is a resident of the United States		
2. The respondent is at least 18 years of age		
3. The respondent is a U.S. citizen		
4. The respondent is a U.S. resident for at least 12 months		
5. The respondent is a U.S. resident for at least 6 months		
6. The respondent is a U.S. resident for at least 3 months		
7. The respondent is a U.S. resident for at least 1 month		
8. The respondent is a U.S. resident for at least 1 week		
9. The respondent is a U.S. resident for at least 1 day		
10. The respondent is a U.S. resident for at least 1 hour		
11. The respondent is a U.S. resident for at least 1 minute		
12. The respondent is a U.S. resident for at least 1 second		
13. The respondent is a U.S. resident for at least 1 millisecond		
14. The respondent is a U.S. resident for at least 1 microsecond		
15. The respondent is a U.S. resident for at least 1 nanosecond		
16. The respondent is a U.S. resident for at least 1 picosecond		
17. The respondent is a U.S. resident for at least 1 femtosecond		
18. The respondent is a U.S. resident for at least 1 attosecond		
19. The respondent is a U.S. resident for at least 1 zeptosecond		
20. The respondent is a U.S. resident for at least 1 yoctosecond		

Letters can be the same even though they look different.

$A, a; A, a; A, a; A, a$

These are:

—all the same letter
—different letters

Check the pairs of pronouns which are in the same case.

he and I

—him and I

These are plurals (e.g., girls, cups, toys). Check all plurals.

cat	trees
dogs	hour
boys	desk

Check all the plurals.

cats	boxes
men	babies
wine	tree

Do these geometric figures belong to the same category?

449

	yes	no
1. The respondent has been employed by the company for at least one year.	80%	20%
2. The respondent has been employed by the company for at least two years.	70%	30%
3. The respondent has been employed by the company for at least three years.	60%	40%
4. The respondent has been employed by the company for at least four years.	50%	50%
5. The respondent has been employed by the company for at least five years.	40%	60%
6. The respondent has been employed by the company for at least six years.	30%	70%
7. The respondent has been employed by the company for at least seven years.	20%	80%
8. The respondent has been employed by the company for at least eight years.	10%	90%
9. The respondent has been employed by the company for at least nine years.	5%	95%
10. The respondent has been employed by the company for at least ten years.	2%	98%

0, 0; 0, 0; 0, 0; 0, 0
Letters can be the same even though they look different.

These are:

all the same letter
---different letters

"Her" and "I" are not in the same case.

Check the pairs of pronouns which are in the same case.

he and I

Degree of Assistance INTER- MEDIATE LEAST			
B	C	A	7
B	A	C	
A	B	C	
C	B	A	
A	C	B	

DO NEXT PROBLEM

EXERCISE 10

The practice problems in Column A were designed to teach GENERALIZATIONS; but they resulted in errors.

Your task in Column B is to revise the problem by adding assistance (as little as necessary).

Your task in Column C is to develop a new item using a different example (with the amount of assistance provided being roughly comparable to that provided in the practice item you created in Column B).

A. EXISTING PRACTICE PROBLEM	B. Your Revision	C. Your New Item
1. These two equations: $x + y$ $x - (-y)$ require: the same operation different operations		
2. Delivering a token as a reward and stopping punishment are operations having: the same effect different effects		
3. Are these nouns both plural? boy's boys yes no		
4. How many of these are examples of "fiscal" policy: "tax cut," "federal spending," "lowered interest rates"? ____		
5. Check all of these which are measures of "central tendency." mean median mode standard deviation standard error		

SEE ANSWERS

ANSWERS

EXERCISE 10

The practice problems in Column A were designed to teach GENERALIZATIONS; but they resulted in errors. Your task in Column B is to revise the problem by adding assistance (as little as necessary).

Your task in Column C is to develop a new item using a different example (with the amount of assistance provided being roughly comparable to that provided in the practice item you created in Column B).

EXISTING PRACTICE PROBLEM		
A.	B.	C.
1.	Your Revision	Your New Item
These two equations: $x + y$ $x - (-y)$ require: the same operation different operations	Two negatives make a positive These two equations: $x + y$ $x - (-y)$ require: the same operation different operations	Two negatives make a positive These two equations: $5 + 4$ $5 - (-4)$ require: the same operation different operations
Delivering a token as a reward and stopping punishment are operations having: the same effect different effects	There are two ways to reinforce behavior. Delivering a token as a reward and stopping punishment are operations having: the same effect different effects	Reinforcement can be delivered in ways other than simply by delivering a reward. Delivering a token as a reward and stopping punishment are operations having: the same effect different effects
Are these nouns both plural? boy's boys yes no	Add an apostrophe to make a possessive doesn't change a noun to plural. Are these nouns both plural? boy's boys yes no	Remember the difference between plurals and possessives. Are these both plurals? girls girls's yes no
How many of these are examples of "fiscal" policy: "tax cut," "federal spending," "lowered interest rates,"	What makes "fiscal" policies alike is "putting money in the hands of consumers." How many of these are examples of "fiscal" policies: "tax cut," "federal spending," "lowered interest rates,"	What makes "fiscal" policies alike is "putting money in the hands of consumers." Are "tax cuts" and "federal spending" alike different
Check all of these which are measures of "central tendency" mean median mode standard deviation standard error	Check all of these which are "averages" or measures of "central tendency." mean median mode standard deviation standard error	Check all of these which are "averages" or "middle scores" or measures of "central tendency." mean median mode standard deviation standard error

DO NEXT PROBLEM

EXERCISE 1E

Your task is to identify by letter the practice problem which provides the most, least, and intermediate amounts of assistance to the student who has to learn to ASSOCIATE INPUTS and ACTIONS.

Put a letter (A, B, or C) in each of the last three columns.

Degree of Assistance
INTER-
MOST MEDIANE LEAST

A.

B.

C.

1. Which is correct? The boy have two dogs X The boy has two dogs	Singular subjects use "has." Which uses the correct verb? X The men have money The man have money	This is a correct example: The girl has a hat The girls have hats Which of these is correct? X The dog has a leash The dog have a leash			
2. Fill in the blank. 3 X 5 = 15 4 X 5 = 20 5 X 5 = 30 6 X 5 = 30	Note the increase of 5 in each answer. Fill in the blank: 2 X 5 = 10 3 X 5 = 15 4 X 5 = 20 5 X 5 = 25	What is the answer? 7 X 5 =			
3. Any object returning to its original shape when a stress is removed is perfectly elastic (e.g., metal coil). Give another example.	Give an example of a perfectly elastic and a non-perfectly elastic object.	A metal spring is perfectly elastic. Give another example.			
4. Adding to purchasing power exemplifies "fiscal" policy. Tax reduction is an example of: fiscal policy monetary policy	Lowering interest rates does not add to purchasing power and is therefore not "fiscal" policy. It is an example of: fiscal policy monetary policy	Tax reduction is an example of: fiscal policy monetary policy			
5. The presence of absence of commas will help you to characterize this sentence. The man, who is 6 feet tall, was elected mayor. restrictive non-restrictive	Characterize the clause in this sentence: "The man, who is 6 feet tall, was elected mayor." restrictive non-restrictive	Non-restrictive clauses are set off by commas. "The man, who is 6 feet tall, was elected mayor." This clause is: restrictive non-restrictive			

SEE ANSWERS

ANSWERS

EXERCISE 1E

Your task is to identify by letter the practice problem which provides the most, least, and intermediate amounts of assistance to the student who has to learn to ASSOCIATE INPUTS and ACTIONS.

Put a letter (A, B, or C) in each of the last three columns.

Degree of Assistance
MOST INTER-MEDIATE LEAST

A.

1. Which is correct?

☒ The boy have two dogs.
☐ The boy has two dogs.

2. Fill in the blank.

$3 \times 5 = 15$
 $4 \times 5 = 20$
 $5 \times 5 = 25$
 $6 \times 5 = 30$

3. Any object returning to its original shape when a stress is removed is perfectly elastic (e.g., metal coil).
Give another example. _____

4. Adding to purchasing power exemplifies "fiscal" policy.
Tax reduction is an example of:
_____ fiscal policy
_____ monetary policy

5. The presence or absence of commas will help you to characterize this sentence.
"The man, who is 6 feet tall, was elected mayor."
_____ restrictive _____ non-restrictive

B.

Singular subjects use "has."

Which uses the correct verb?

☒ The men have money.
☐ The man have money.

Note the increase of 5 in each answer. Fill in the blank:

$2 \times 5 = 10$
 $3 \times 5 = 15$
 $4 \times 5 = 20$
 $5 \times 5 = 25$

Give an example of a perfectly elastic and a non-perfectly elastic object.

Lowering interest rates does not add to purchasing power and is therefore not "fiscal" policy.
It is an example of:
_____ fiscal policy
_____ monetary policy

Characterize the clause in this sentence:
"The man, who is 6 feet tall, was elected mayor."
_____ restrictive _____ non-restrictive

C.

This is a correct example:

The girl has a hat.
The girls have hats.
Which of these is correct?
☒ The dog has a leash.
☐ The dog have a leash.

What is the answer?

$7 \times 5 = 35$

A metal spring is perfectly elastic.
Give another example. _____

Tax reduction is an example of:
_____ fiscal policy
_____ monetary policy

Non-restrictive clauses are set off by commas.
"The man, who is 6 feet tall, was elected mayor."
This clause is:
_____ restrictive _____ non-restrictive

C	B	A
B	A	C
A	C	B
B	A	C
C	A	B

DO NEXT PROBLEM

EXERCISE 1F

The practice problems in Column A were designed to teach ASSOCIATIONS, but they resulted in errors.

Your task in Column B is to revise the problem by adding assistance (as little as necessary).

Your task in Column C is to develop a new item using a different example (with the amount of assistance provided being roughly comparable to that provided in the practice item you created in Column B).

C.

B.

Your New Item

Your Revision

EXISTING PRACTICE PROBLEM

1. Spell these words that I will say out loud.

"receive"
"believe"

2. Which is correct?

___ I is sick
___ I am sick
___ I are sick

3. Correct the answer if it's wrong.

$$7 \times 8 = 63$$

4. Which is correct, 1 or 2?

- (1) The man, who is tall, is sick
(2) The man who is tall is sick

5. To compute "current" values from voltage and resistance, which formula would you use?

$$I = \frac{V}{R} \quad P = V \times I$$

SEE ANSWERS

ANSWERS

EXERCISE IF

The practice problems in Column A were designed to teach ASSOCIATIONS; but they resulted in errors.

Your task in Column B is to revise the problem by adding assistance (as little as necessary).

Your task in Column C is to develop a new item using a different example (with the amount of assistance provided being roughly comparable to that provided in the practice item you created in Column B).

A.

B.

C.

EXISTING PRACTICE PROBLEM

Your Revision

Your New Item

1. Spell these words that I will say out loud.

"receive"
"believe"

Remember "i" before "e" except after "c."

Spell these words that I will say out loud.

"receive"
"believe"

Remember the order of "i" and "e" depends on the letter then come after.

Spell these words that I will say out loud.
"deceive"
"reprieve"

2. Which is correct?

☐ I is sick
☐ I am sick
☐ I are sick

"I" takes its own special form of the verb "to be."

Which is correct?

☐ I is sick
☐ I am sick
☐ I are sick

"I" takes its own special form of the verb "to be."

Which is correct?

☐ I am ready to go
☐ I is ready to go
☐ I are ready to go

3. Correct the answer if it's wrong.

$$7 \times 8 = 63$$

This is a wrong answer. Correct it.

$$7 \times 8 = 63$$

This is a wrong answer. Correct it.

$$4 \times 9 = 40$$

4. Which is correct, 1 or 2?

(1) The man, who is tall, is sick
(2) The man who is tall is sick

Non-restrictive clauses take commas. Restrictive clauses do not.

Which is correct, 1 or 2?

(1) The man, who is tall, is sick
(2) The man who is tall is sick

Non-restrictive clauses take commas. Restrictive clauses do not.

Which is correct, 1 or 2?

(1) The man who is tall can reach higher
(2) The man, who is tall, can reach higher

5. To compute "current" values from voltage and resistance, which formula would you use?

$$I = \frac{V}{R} \quad \text{---} \quad P = V \times I$$

Current is obtained by dividing resistance into voltage.

To compute "current" values from voltage and resistance, which formula would you use?

$$I = \frac{V}{R} \quad P = V \times I$$

DO NEXT PROBLEM

EXERCISE 1G

Your task is to identify by letter the practice problem which provides the most, least, and intermediate amounts of assistance to the student who has to learn to CHAIN a series of associations.

Put a letter (A, B, or C) in each of the last three columns.

Degree of Assistance
INTER-
MOST INTERMEDIATE LEAST

A.

1. Expand this binomial:

$$(x + y)^5$$

2. Here is a complete set of procedures and guidelines to follow: 1, 2, 3, and 4 (spelled out) when "shaping."

Use a "shaping" routine to get a student to work for longer periods.

3. Note the presence of the parenthesis.

For the following data (____, etc.) obtain $(\sum x)^2$

4. Write a paragraph in which ideas develop coherently.

5. Check this threading diagram as you watch two demonstrations of the threading of a film projector.

Which is done in the correct sequence? ____ 1 ____ 2

B.

There should be six terms in your answer.

Expand this binomial:

$$(x + y)^5$$

Switch to intermittent reinforcement requires appropriate conditions.

Use a "shaping" routine to get a student to work for longer periods.

Remember "to square" as the last step.

For the following data (____, etc.) obtain $(\sum x)^2$

Remember to end a paragraph with the topic sentence.

Write a paragraph in which you do this.

Testing tightness should be done before proceeding.

Watch the two demonstrations of the sequence of steps in threading a projector.

Which is the correct sequence? ____ 1 ____ 2

C.

Multiply exponents by coefficients and divide by the term's number in the series to get the next coefficient.

Expand this binomial:

$$(x + y)^5$$

Use a "shaping" routine to get a student to work for longer periods.

For the following data (____, etc.) obtain $(\sum x)^2$.

Here's a sample paragraph.
(-----)

Write a new paragraph in which ideas develop coherently.

Watch the two demonstrations of the sequence of steps in threading a projector.

Which is the correct sequence?

____ 1 ____ 2

ANSWERS

EXERCISE 16

Your task is to identify by letter the practice problem which provides the most, least, and intermediate amounts of assistance to the student who has to learn to CHAIN a series of associations.

Put a letter (A, B, or C) in each of the last three columns.

A.

B.

C.

Degree of Assistance
INTER-

MOST MEDIANTE LEAST

- Expand this binomial:
 $(x + y)^5$
- Here is a complete set of procedures and guidelines to follow: 1, 2, 3, and 4 (spelled out) when "shaping." Use a "shaping" routine to get a student to work for longer periods.
- Note the presence of the parenthesis.
For the following data (_____, etc.) obtain $(\Sigma x)^2$
- Write a paragraph in which ideas develop coherently.
- Check this threading diagram as you watch two demonstrations of the threading of a film projector.
Which is done in the correct sequence? ____ 1 ____ 2

- There should be six terms in your answer.
Expand this binomial:
 $(x + y)^5$
- Switch to intermittent reinforcement requires appropriate conditions.
Use a "shaping" routine to get a student to work for longer periods.
- Remember "to square" as the last step.
For the following data (_____, etc.) obtain $(\Sigma x)^2$
- Remember to end a paragraph with the topic sentence.
Write a paragraph in which you do this.
- Review this diagram and then put it away when you watch the two demonstrations of threading a film projector.
Which is done in the correct sequence? ____ 1 ____ 2

- Multiply exponents by coefficients and divide by the term's number in the series to get the next coefficient.
Expand this binomial:
 $(x + y)^5$
- Use a "shaping" routine to get a student to work for longer periods.
- For the following data (_____, etc.) obtain $(\Sigma x)^2$
- Here's a sample paragraph.
(-----)
Write a new paragraph in which ideas develop coherently.
- Watch the two demonstrations of the sequence of steps in threading a projector.
Which is the correct sequence?
1 ____ 2

C	B	A
A	B	C
B	A	C
B	C	A
A	B	C

DO NEXT PROBLEM

EXERCISE 1H

Your task in this exercise is to indicate (by putting an X through it) which (A or B) is the better of two practice items. Better is defined in terms of variables identified in the first column.

FORMAT VARIABLES

A.

B.

1. Adequacy of vocabulary or readability level
for: novice developers of instructional materials

The results of a task analysis serve as a basis for other types of analyses. For example, it is useful for classifying criterion behavior into one of Gagné's eight conditions of learning.

Task analysis results provide the data base for subsequent categorization of types of learning as per the Gagné taxonomy.

2. Adequacy of task instructions

"Edit this paragraph for correct punctuation."

"Edit this paragraph to make it more stylistically acceptable."

3. Adequacy of devices to control attention/observation

Compare and contrast columns and rows in this table.

The best way to use this table is as follows: (1) compare entries in each column with those in each other column; (2) work down the columns, one row at a time.

4. Adequacy of vocabulary or readability level
for: third graders

Remember to use the "s" marker when changing a singular noun into a plural form.

Remember the way to make a plural is to add the letter "s" at the end of a noun which is singular.

5. Adequacy of task instructions

If the digit to be rounded off is even (and is followed by "5") raise the value; if it is odd, do nothing.

Observe the usual conditions in rounding off decimals.

ANSWERS

EXERCISE 11

Your task in this exercise is to indicate (by putting an X through it) which (A or B) is the better of two practice items. Better is defined in terms of variables identified in the first column.

FORMAT VARIABLES

1.

Adequacy of vocabulary or readability level
for: novice developers of instructional materials

A.

~~The results of a task analysis serve as a basis for other types of analyses. For example, it is useful for classifying criterion behavior into one of Gagne's eight conditions of learning.~~

B.

Task analysis results provide the data base for subsequent categorization of types of learning as per the Gagné taxonomy.

2.

Adequacy of task instructions

~~"Edit this paragraph for correct punctuation."~~

"Edit this paragraph to make it more stylistically acceptable."

3.

Adequacy of devices to control attention/observation

Compare and contrast columns and rows in this table.

~~The best way to use this table is as follows: (1) compare entries in each column with those in each other column; (2) work down the columns, one row at a time.~~

4.

Adequacy of vocabulary or readability level
for: third graders

Remember to use the "s" marker when changing a singular noun into a plural form.

~~Remember the way to make a plural is to add the letter "s" at the end of a noun which is singular.~~

5.

Adequacy of task instructions

~~If the digit to be rounded off is even (and is followed by "5," raise the value; if it is odd, do nothing.~~

Observe the usual conditions in rounding off decimals.

DO NEXT PROBLEM

EXERCISE 11

Your task is to improve on the practice problem which appears in Column A. Improvement should be for adequacy with respect to the FORMAT VARIABLES identified in the first column.

FORMAT VARIABLES		Your Revision
1. Adequacy of vocabulary or readability level for: elementary graders	A. On what basis would you categorize these leaves?	
2. Adequacy of vocabulary or readability level for: high school dropouts	There is considerable evidence that employability is closely related to good speech.	
3. Adequacy of task instructions	Identify the option you feel is correct.	
4. Adequacy of task instructions	Illustrate the differences between "perfectly" and "non-perfectly" elastic objects.	
5. Adequacy of devices to control attention/observation	Watch how I disassemble this choke.	

SEE ANSWERS

ANSWERS

EXERCISE 11

Your task is to improve on the practice problem which appears in Column A. Improvement should be for adequacy with respect to the FORMAT VARIABLES identified in the first column.

FORMAT VARIABLES

A.

Your Revision

1. Adequacy of vocabulary or readability level for: elementary readers

On what basis would you categorize these leaves?

You have to decide to put these leaves into four piles. Each pile should have leaves which are alike. How would you decide what should go in each pile?

2. Adequacy of vocabulary or readability level for: high school dropouts

There is considerable evidence that employability is closely related to good speech.

A lot of studies have shown how important it is to talk in the right way. For example, being able to get a good job often depends on talking the right way.

3. Adequacy of task instructions

Identify the option you feel is correct.

Put an X alongside the answer you feel is the correct one.

4. Adequacy of task instructions

Illustrate the differences between "perfectly" and "non-perfectly" elastic objects.

Give examples of perfectly and non-perfectly elastic objects and explicate into what the properties of each object are which make it different from the other.

5. Adequacy of devices to control attention/observation

Watch how I disassemble this choke.

Look at which part I disassemble first; or look at the way I grasp this part.

END OF EXERCISE

After reading
Handbook for
sub STEP(S)

J.1.1-J.1.3

DO
EXERCISE

2

Exercises 2A-2D are designed to give you practice identifying on the basis of observational data or responses to probes the types of learning failures which have occurred.

TURN TO NEXT PAGE FOR PROBLEMS

EXERCISE 2A

Your task is to put an X through the description, A or B, which correctly identifies the most likely type of learning which is involved in each practice problem.

PRACTICE PROBLEMS

1. Using commas before and after non-restrictive clauses; leaving them out for restrictive clauses
The GENERALIZATION involved is:

A. Seeing the difference between clauses which have commas and those which do not

B.

Seeing the difference between clauses which are restrictive and those which are not

2. Given problem requiring resistance to be computed given values for current and voltage, selects and uses Ohm's Law
The DISCRIMINATION involved is:

A. Seeing the difference between problems requiring Ohm's Law and those requiring some other formula

Seeing the difference between values for current and voltage

3. Using commas before and after non-restrictive clauses; leaving them out for restrictive clauses
The ASSOCIATION involved is:

Whether to use commas for clauses which are restrictive or for clauses which are non-restrictive

Whether to use or to omit commas

4. Given problem requiring resistance to be computed given values for current and voltage, selects and uses Ohm's Law
The GENERALIZATION involved is:

Seeing the similarity between problems involving resistance

Seeing the similarity among problems which require the use of Ohm's Law

5. Using commas before and after non-restrictive clauses; leaving them out for restrictive clauses
The GENERALIZATION involved is:

Seeing the similarity among non-restrictive clauses and the similarity among restrictive clauses

Seeing the similarity among clauses with commas and the similarity among clauses without commas

SEE ANSWERS

Your task is to put an X through the description, A or B, which correctly identifies the most likely type of learning which is involved in each practice problem.

PRACTICE PROBLEMS

1.

Using commas before and after non-restrictive clauses; leaving them out for restrictive clauses
The DISCRIMINATION involved is:

A.

Seeing the difference between the presence and absence of commas.

B.

~~Seeing the difference between clauses which are restrictive and those which are not~~

2.

Given problem requiring resistance to be computed given values for current and voltage, selects and uses Ohm's Law
The DISCRIMINATION involved is:

~~Seeing the difference between problems requiring Ohm's Law and those requiring some other formula~~

Seeing the difference between values for current and voltage

3.

Using commas before and after non-restrictive clauses; leaving them out for restrictive clauses
The ASSOCIATION involved is:

~~Whether to use commas for clauses which are restrictive or for clauses which are non-restrictive~~

Whether to use or to omit commas

4.

Given problem requiring resistance to be computed selects and uses Ohm's Law to compute it.
The GENERALIZATION involved is:

Seeing the similarity between problems involving resistance

~~Seeing the similarity among problems which require the use of Ohm's Law~~

5.

Using commas before and after non-restrictive clauses; leaving them out for restrictive clauses
The GENERALIZATION involved is:

~~Seeing the similarity among non-restrictive clauses and the similarity among restrictive clauses~~

Seeing the similarity among clauses with commas and the similarity among clauses without commas

DO NEXT PROBLEM

EXERCISE 2B

By putting an X in the appropriate column, indicate which type of learning failure is likely to have occurred in each of the following situations.

IF FOR A GIVEN SITUATION IT IS NOT POSSIBLE TO TELL WHICH TYPE OF FAILURE HAS OCCURRED, LEAVE THE ROW BLANK. THIS MAY BE THE CASE BECAUSE THE SAME WRONG ANSWER WILL BE GIVEN NO MATTER WHICH TYPE OF FAILURE HAS OCCURRED.

D = DISCRIMINATIONS
G = GENERALIZATIONS
A = ASSOCIATIONS
C = CHAINS

		D	G	A	C
1.	Item: Punctuate this sentence: "The man who is honest always wins." Response: Wrongly inserted commas before and after the restrictive clause.				
2.	Item: Presented two examples of "squares" (differing in size) and asked if they were the same or different type of geometric figure. Response: Different.				
3.	Item: Do these sound the same or different? thin - fin Response: The same.				
4.	Item: Why did you call this lever a Class I type? Response: Classes depend on relative positions of fulcrum, Load, and effort force. But I can't remember which is I, which is II, and which is III.				
5.	Item: Give me an example of a recall and a transfer test item Response: Gave two examples of a recall item.				
6.	Item: Use the correct present tense of "to be" in the blank below. Response: The women <u>is</u> very pretty.				
7.	Item: Match up these concepts: a. tax reduction <u> </u> fiscal policy b. change in discount rate <u> </u> monetary policy Response: Incorrect match.				
8.	Item: Why did you make the computation the way you did? Response: I knew it was O.K. to round off, but I didn't know at what point to do it.				
9.	Item: Given examples of Bernoulli's Law (lift on airplane wing and speed of fluid in pipes), is asked if the same or different principles explain them. Response: Says "different principles."				
10.	Item: Asked to tell time. Response: Says "five of three" when should have said "quarter after."				

ANSWERS

EXERCISE 2B

By putting an X in the appropriate column, indicate which type of learning failure is likely to have occurred in each of the following situations.

IF FOR A GIVEN SITUATION IT IS NOT POSSIBLE TO TELL WHICH TYPE OF FAILURE HAS OCCURRED, LEAVE THE ROW BLANK. THIS MAY BE THE CASE BECAUSE THE SAME WRONG ANSWER WILL BE GIVEN NO MATTER WHICH TYPE OF FAILURE HAS OCCURRED.

D = DISCRIMINATIONS
G = GENERALIZATIONS
A = ASSOCIATIONS
C = CHAINS

		D	G	A	C
1.	Item: Punctuate this sentence: "The man who is honest always wins." Response: <u>Wrongly</u> inserted commas before and after the restrictive clause.				
2.	Item: Presented two examples of "squares" (differing in size) and asked if they were the same or different type of geometric figure. Response: Different.		X		
3.	Item: Do these sound the same or different? thin - fin Response: The same.	X			
4.	Item: Why did you call this lever a Class I type? Response: Classes depend on relative positions of fulcrum, load, and effort force. But I can't remember which is I, which is II, and which is III.			X	
5.	Item: Give me an example of a recall and a transfer test item. Response: Gave two examples of a recall item.	X			
6.	Item: Use the correct present tense of "to be" in the blank below. Response: Thw women <u>is</u> very pretty.				
7.	Item: Match up these concepts: a. tax reduction <u> </u> fiscal policy b. change in discount rate <u> </u> monetary policy Response: Incorrect match.			X	
8.	Item: Why did you make the computation the way you did? Response: I knew it was O.K. to round off, but I didn't know at what point to do it.				X
9.	Item: Given examples of Bernoulli's Law (lift on airplane wing and speed of fluid in pipes), is asked if the same or different principles explain them. Response: Says "different principles."		X		
10.	Item: Asked to tell time. Response: Says "five of three" when should have said "quarter after."				

EXERCISE 2C

Your task is to indicate with an X drawn through A or B which is the better - SPECIFIC probe for determining what the learning failure is described in the first column.

SITUATION

PROBE A

PROBE B

1. Item: Punctuate this sentence: "The man who is honest always wins."
Response: Wrongly inserted commas before and after the restrictive clause. PROBE: For a DISCRIMINATION failure?

How would you punctuate these two sentences:
(1) The man who saves usually is prepared.
(2) The man who saves his money is John's friend.
the same way differently

How would you punctuate these two sentences:
(1) The girl who is very pretty dates a lot.
(2) The girl who is unattractive has trouble dating.
the same way differently

2. Item: Punctuate this sentence: "The man who is honest always wins."
Response: Wrongly inserted commas before and after the restrictive clause. PROBE: For a GENERALIZATION failure?

How would you punctuate these two sentences:
(1) The man who saves usually is prepared.
(2) The man who saves his money is John's friend.
the same way differently

How would you punctuate these two sentences:
(1) The girl who is very pretty dates a lot.
(2) The girl who is unattractive has trouble dating.
the same way differently

3. Item: Punctuate this sentence: "The man who is honest always wins."
Response: Wrongly inserted commas before and after the restrictive clause. PROBE: For an ASSOCIATION failure?

Which is the correct way to punctuate?
(1) The man who saves usually is practical.
(2) The man, who saves, usually is practical.

Is this sentence correctly punctuated: "The man who is honest always wins."
yes no

4. Item: Asked to tell time.
Response: Says "five of three" when should have said "quarter after." PROBE: For a DISCRIMINATION failure?

Is the time on these two clocks the same or different?
(One clock shows 2:55; the other, 11:15)

What is the time here?
(Shown a clock at 2:55)
2:55 11:15

5. Item: What type of financial policy is involved when the government primes the pump by spending?
Response: monetary policy (wrong) PROBE: For a GENERALIZATION failure?

Are these two types of actions of the same or different types?
(1) government spending
(2) income tax reduction

Are these two types of actions of the same or different types?
(1) government spending
(2) lowered discount rates

ANSWERS

EXERCISE 2C

Your task is to indicate with an X drawn through A or B which is the better - specific probe for determining what the learning failure is described in the first column.

SITUATION

1. Item: Punctuate this sentence: "The man who is honest always wins."
Response: Wrongly inserted commas before and after the restrictive clause.
For a GENERALIZATION failure?

2. Item: Punctuate this sentence: "The man who is honest always wins."
Response: Wrongly inserted commas before and after the restrictive clause.
For a GENERALIZATION failure?

3. Item: Punctuate this sentence: "The man who is honest always wins."
Response: Wrongly inserted commas before and after the restrictive clause.
For an ASSOCIATION failure?

4. Item: Asked to tell time.
Response: Says "five of three" when should have said "quarter after."
For a DISCRIMINATION failure?

5. Item: What type of financial policy is involved when the government primes the pump by spending?
Response: monetary policy (wrong)
For a GENERALIZATION failure?

PROBE A

~~How would you punctuate these two sentences:
(1) The man who saves usually is prepared.
(2) The man who saves his money is John's friend.
the same way differently~~

~~How would you punctuate these two sentences:
(1) The man who saves usually is prepared.
(2) The man who saves his money is John's friend.
the same way differently~~

~~Which is the correct way to punctuate:
(1) The man who saves usually is practical.
(2) The man, who saves, usually is practical.~~

~~Is the time on these two clocks the same or different?
(One clock shows 2:55; the other, 11:15)~~

~~Are these two types of actions of the same or different types?
(1) government spending
(2) income tax reduction~~

PROBE B

How would you punctuate these two sentences:
(1) The girl who is very pretty dates a lot.
(2) The girl who is unattractive has trouble dating.
the same way differently

~~How would you punctuate these two sentences:
(1) The girl who is very pretty dates a lot.
(2) The girl who is unattractive has trouble dating.
the same way differently~~

Is this sentence correctly punctuated: "The man who is honest always wins."
yes no

What is the time here?
(Shown a clock at 2:55)
2:55 11:15

Are these two types of actions of the same or different types?
(1) government spending
(2) lowered discount rates

DO NEXT PROBLEM

EXERCISE 2D

For each situation below first develop a general problem and then a more specific probe to determine the nature of the learning failure.

PROGRAM PROBLEM	GENERAL PROBE	SPECIFIC PROBE (For DISCRIMINATIONS)
1. Item: Complete this sentence: "The cat's tail." Response: The cat's tail are long.		
2. Item: Solve this problem: $5 - (-4) =$ Response: $5 - (-4) = 1$		(For GENERALIZATIONS)
3. Item: What does "le livre" mean? Response: Pound. Le livre - book La livre - pound		(For ASSOCIATIONS)
4. Item: Read this word: "brown." Response: Says "drown."		(For DISCRIMINATIONS)
5. Item: Classify this tree (e.g., redwood) as either coniferous or deciduous. Response: Wrongly classifies, e.g., as a "deciduous" tree.		(For GENERALIZATIONS)

SEE ANSWERS

ANSWERS

EXERCISE 20

For each situation below first develop a general problem and then a more specific probe to determine the nature of the learning failure.

PROGRAM PROBLEM

GENERAL PROBE

SPECIFIC PROBE

1. Item: Complete this sentence: "The cat's tail." Response: The cat's tail are long.

What did you say "are long"?

(For DISCRIMINATIONS)
When you use a verb with these two words "cat's" and "cats," do you use the same verb?

2. Item: Solve this problem: $5 - (-4) =$ Response: $5 - (-4) = 1$

What did you say "one"?

(For GENERALIZATIONS)
Are you supposed to treat these the same way or different ways?
 $x - "$
 $x - (-4)$

3. Item: What does "le livre" mean? Response: Pound.
Le livre - book
La livre - pound

Was there another answer you could have given?

(For ASSOCIATIONS)
Match up these words:
(1) Le livre pound
(2) La livre book

4. Item: Read this word: "brown." Response: Says "drown."

What letter is this?

(For DISCRIMINATIONS)
Are these letters the same or different?
b - d

5. Item: Classify this tree (e.g., redwood) as either coniferous or deciduous. Response: Wrongly classified, e.g., as a "deciduous" tree.

What did you say "deciduous"?

(For GENERALIZATIONS)
Do these trees belong to the same or to different categories (e.g., pine and spruce)?

END OF EXERCISE

Exercises 3A-3C are designed to give you practice in making the types of revisions in instructional programs appropriate to program weaknesses which have been identified from program, test, and interview data.

FOLD OUT THIS PAGE

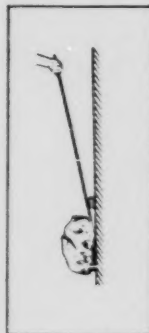
The exercises on program revision which follow are based on the instructional sequence which appears on page J-32 inside.

Review this instructional sequence, and then do the exercises which follow.

1. There are three classes of levers: I, II, and III:
 - Class I levers have the fulcrum between the load and the effort force.
 - Class II levers have the load between the fulcrum and the effort force.
 - Class III levers have the effort force between the load and the fulcrum.

What type of lever is this?

___ I ___ II ___ III



2. What type of lever is this?

___ I ___ II ___ III



3. What type of lever is this?

___ I ___ II ___ III



4. What is the basis for classification of levers?

5. Give some examples of each type of lever (new examples).

EXERCISE 3A

Your task in this exercise is to indicate by putting an X through it which of the two revisions (A or B) is better suited to overcome the identified program weakness described in the first column.

IDENTIFIED PROGRAM WEAKNESS

Revision A

Revision B

1. Excessive leanness due to TOO ABRUPT FADING of cues

Add as a cue to Problem #2:

 "This is a Type II lever. Is this lever (original example in #2) the same type?"

Add as an added cue to Problem #4: "Remember, it is the positions of parts of the lever relative to one another that determines the type of lever."

2. Excessive leanness due to TOO ABRUPT FADING of cues

Repeat the definition given in Problem #1 in Problem #2.

Repeat the definition given in Problem #1 in Problem #3.

3. Excessive leanness due to INSUFFICIENT NUMBER OF PROBLEMS OR EXAMPLES

Adding this example (to be classified) between Problems #1 and #2.


Adding this example (to be classified) between Problems #4 and #5.


4. Excessive leanness due to INSUFFICIENT NUMBER OF PROBLEMS OR EXAMPLES

Early in the sequence adding this example:


Early in the sequence adding this example:


5. Excessive leanness due to INSUFFICIENT CUEING IN INDIVIDUAL PROBLEMS

Repeat the definition given in Problem #1 in Problem #2.

Add as a cue to Problem #2:

 "This is a Type II lever. Is this lever (original example in #2) the same type?"

SEE ANSWERS

EXERCISE 3A

Your task in this exercise is to indicate by putting an X through it which of the two revisions (A or B) is better suited to overcome the identified program weakness described in the first column.

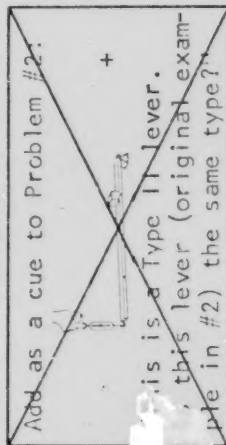
IDENTIFIED PROGRAM WEAKNESS

Revision A

Revision B

1.

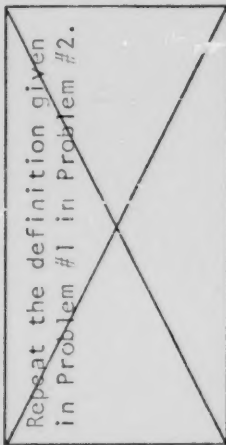
Excessive leanness
due to
TOO ABRUPT FADING
of cues



Add as an added cue to Problem #4: "Remember, it is the positions of parts of the lever relative to one another that determines the type of lever."

2.

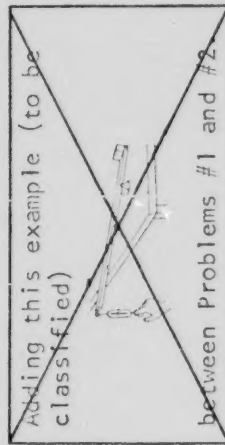
Excessive leanness
due to
TOO ABRUPT FADING
of cues



Repeat the definition given in Problem #1 in Problem #3.

3.

Excessive leanness
due to
INSUFFICIENT NUMBER
OF PROBLEMS OR EXAMPLES



Adding this example (to be classified) between Problems #4 and #5.

4.

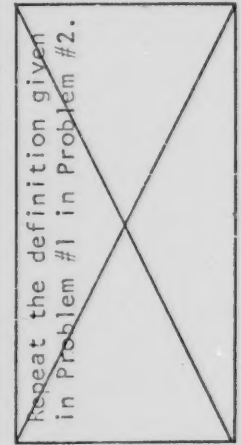
Excessive leanness
due to
INSUFFICIENT NUMBER
OF PROBLEMS OR EXAMPLES



Early in the sequence adding this example:

5.

Excessive leanness
due to
INSUFFICIENT CUING
IN INDIVIDUAL PROBLEMS



Add as a cue to Problem #2: "This is a Type II lever. Is this lever (original example in #2) the same type?"

DO NEXT PROBLEM

EXERCISE 3B

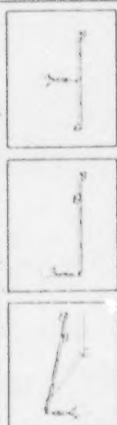
Your task in this exercise is to indicate by putting an X through it which of the two revisions (A or B) is better suited to overcome the identified program weakness described in the first column.

IDENTIFIED PROGRAM WEAKNESS

1. Inadequate treatment of DISCRIMINATIONS between classes

Revision A

Adding problem in which the three classes are directly contrasted pictorially.



Revision B

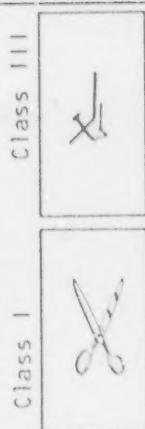
Adding verbal cuing as in Practice Problem #1 (on page J-32) to additional problems.

2. Inadequate treatment of GENERALIZATIONS within classes

Adding problems that include these examples:



Adding problems that include these examples:

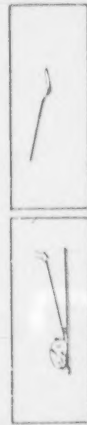


3. Inadequate treatment of ASSOCIATIONS between classes and labels I, II, III

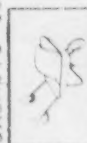
Practice of rules for labeling lever classes as, I, II, or III.

4. Inadequate treatment of DISCRIMINATIONS between classes

Adding a recognition item in which two examples from different classes



Adding another example to be classified.



Verbal cue identifies where fulcrum, load, and effort force are in the example.

5. Inadequate treatment of GENERALIZATIONS within classes

Adding this example to be classified.



Adding this example to be classified.



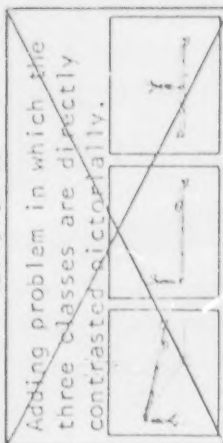
Your task in this exercise is to indicate by putting an X through it which of the two revisions (A or B) is better suited to overcome the identified program weakness described in the first column.

IDENTIFIED PROGRAM WEAKNESS

Revision A

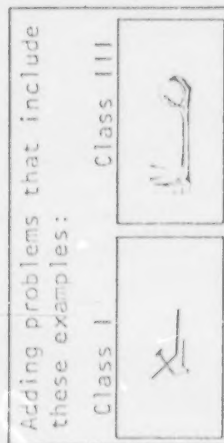
Revision B

1. Inadequate treatment of DISCRIMINATIONS between classes



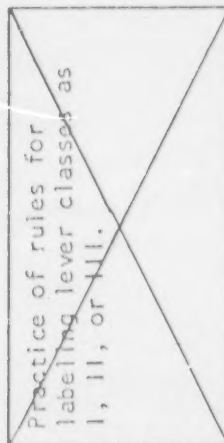
Adding verbal cuing as in Practice Problem #1 (on page J-32) to additional problems.

2. Inadequate treatment of GENERALIZATIONS within classes



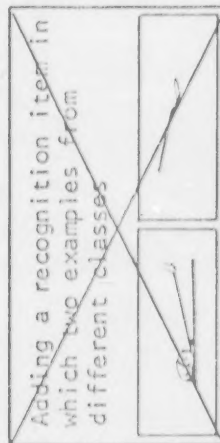
Adding problems that include these examples:
Class I
Class III

3. Inadequate treatment of ASSOCIATIONS between classes and labels I, II, III



Practice of rules for labeling lever classes as I, II, or III.

4. Inadequate treatment of DISCRIMINATIONS between classes



Adding a recognition item in which two examples from different classes be classified.

5. Inadequate treatment of GENERALIZATIONS within classes



Adding this example to be classified.

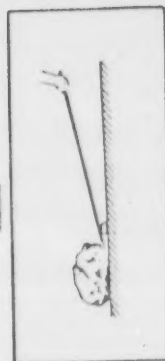
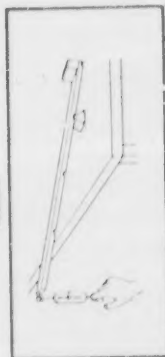
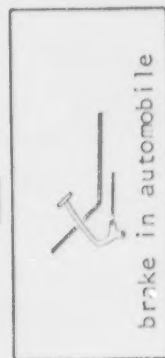
DO NEXT PROBLEM

EXERCISE 3C

Your task in each of the three problems below is to identify by number (in the space provided) the sequence in which you would present to students each of the four examples shown. Your decision should be based on how easy it would be for the learner to generalize from one example to another; i.e., in each set put the easiest example to recognize first and the hardest last.

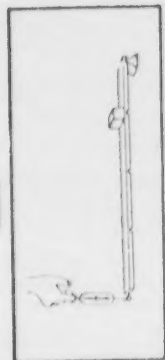
1.

Class
I



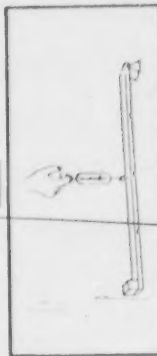
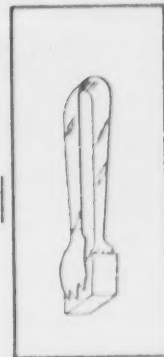
2.

Class
II



3.

Class
III



SEE ANSWERS

ANSWERS

EXERCISE 3C

Your task in each of the three problems below is to identify by number (in the space provided) the sequence in which you would present to students each of the four examples shown.

Your decision should be based on how easy it would be for the learner to generalize from one example to another; i.e., in each set put the easiest example to recognize first and the hardest last.

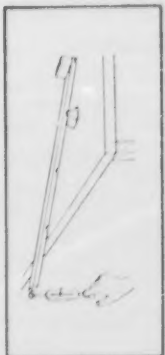
1.



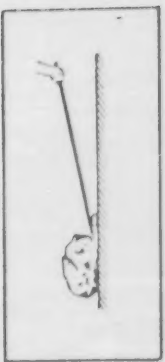
3



2



1



2.



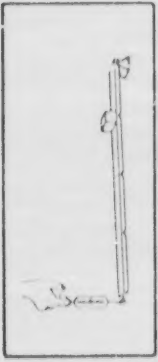
4



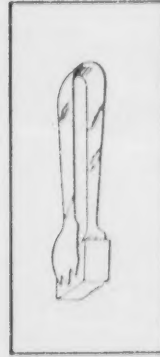
3



1



3.



2



1



3



4

DO NEXT PROBLEM

EXERCISE 3D

Your task in this exercise is to make two types of revisions in Columns A and B which will overcome the types of weaknesses identified in the first column.

Pictorial examples from Exercise 3C can be built into your revisions.

IDENTIFIED PROGRAM WEAKNESS	(A) ADD PRACTICE PROBLEM	(B) ADD CUIING TO AN EXISTING PRACTICE PROBLEM
1. Inadequate treatment of DISCRIMINATIONS between examples belonging to different classes	Before Problem #2	Add Cuiing to Problem #2
2. Inadequate treatment of GENERALIZATIONS between examples belonging to different classes	Before Problem #2	Add cuiing to Problem #2
3. Inadequate treatment of ASSOCIATIONS between examples belonging to different classes		

SEE ANSWERS

ANSWERS

EXERCISE 3D

Your task in this exercise is to make two types of revisions in Columns A and B which will overcome the types of weaknesses identified in the first column. Pictorial examples from Exercise 3C can be built into your revisions.

IDENTIFIED PROGRAM WEAKNESS	(A) ADD PRACTICE PROBLEM	(B) ADD Cuing TO AN EXISTING PRACTICE PROBLEM
1. Inadequate treatment of DISCRIMINATIONS between examples belonging to different classes	Before Problem #2 -Use a simpler example than the watercress -Show contrasting times from all three classes	Add Cuing to Problem #2 Label the <i>fulcrum</i>, <i>load</i>, and <i>effort force</i> on the watercress
2. Inadequate treatment of GENERALIZATIONS between examples belonging to different classes	Before Problem #2 Show two examples from the same class; ask if they are the same or different times	Add Cuing to Problem #2 Show another example from the same class with its parts labeled; then ask the student to classify the example in #2
3. Inadequate treatment of ASSOCIATIONS between examples belonging to different classes	Show three times (relatively easy examples) and have students match up the times with a label (I, II, or III)	The labeling can be provided as in Problem #1, but use difficult example, as in Problem #3

FOLD BACK PAGE J-32

DO NEXT PROBLEM

EXERCISE 3E

This exercise, in contrast to Exercises 3A-3D which were devoted to problems stemming from excessive leanness, is devoted to practice with practice problems which are not lean enough.

FOLD OUT THIS PAGE

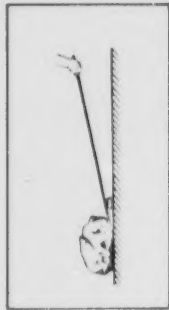
The exercises on program revision which follow are based on the instructional sequence which appears on page J-42 inside.

J-40 / J-41

Review this instructional sentence, and then do the exercises which follow.

1. There are three classes of levers: I, II, and III:
 - Class I levers have the fulcrum between the load and the effort force.
 - Class II levers have the load between the fulcrum and the effort force.
 - Class III levers have the effort force between the load and the fulcrum.

Classify all these levers:



2. What is the basis for classification of levers?

3. Give some examples of each type of lever (new examples).

Results: Few errors on Problem #1; high frequency of errors on #'s 2 and 3.

EXERCISE 3E

Your task in this exercise is to indicate by putting an X through it which of the two revisions (A or B) is better suited to overcome the identified program weakness described in the first column.

IDENTIFIED PROGRAM WEAKNESS

Revision A

Revision B

1.

To overcome
excessive cuing

What type of lever is this?



What type of lever is this?



2.

To overcome
too inadequate fading

What type of lever is this?



What type of lever is this?



3.

To overcome
inadequate amount of
criterion-like practice

What type of lever is this?



What type of lever is this?



4.

To overcome
a combination
of above weaknesses

A repetition of Practice
Problem #1 (on page J-42),
but without the cues for
classification

A repetition of Practice
Problem #1 (on page J-42),
with the cues provided
again

5.

To overcome
a combination
of above weaknesses

The presentation of single
examples to be classified
(prior to Problem #2 on
page J-42), with cues
available

The presentation of single
examples to be classified
(prior to Problem #2 on
page J-42), without cues
available

SEE ANSWERS

ANSWERS

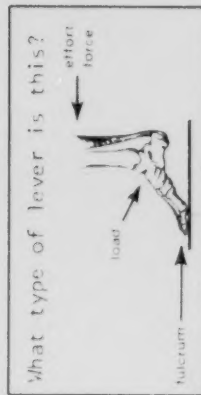
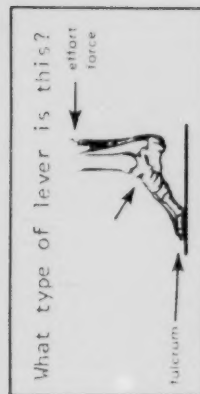
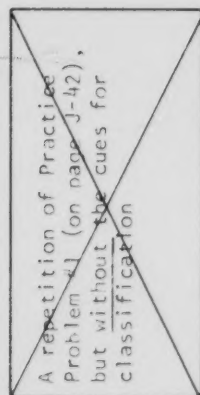
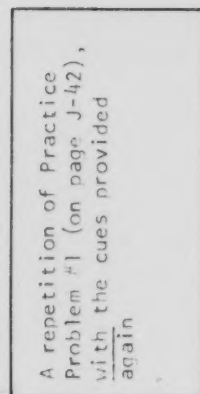
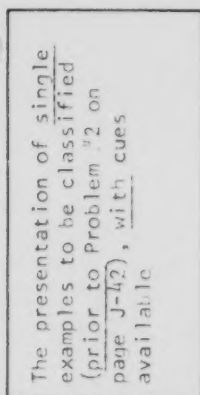
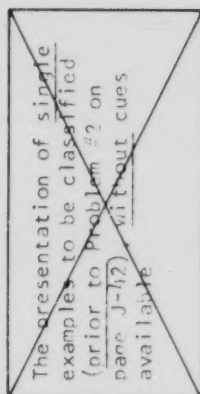
EXERCISE 3E

Your task in this exercise is to indicate by putting an X through it which of the two revisions (A or B) is better suited to overcome the identified program weakness described in the first column.

IDENTIFIED PROGRAM WEAKNESS

Revision A

Revision B

1. To overcome <u>excessive cuing</u>		
2. To overcome too inadequate fading		
3. To overcome inadequate amount of criterion-like practice		
4. To overcome a combination of above weaknesses		
5. To overcome a combination of above weaknesses		

FOLD BACK PAGE J-42

END OF EXERCISE

Exercises 4A-4F are designed to give you practice in computing and analyzing test results in order to determine type of learning failure.

FOLD OUT THIS PAGE

The exercises which follow
are based on the results
which appear on the form
on page J-46.

[illegible]

EXERCISE 4A

Your task is to summarize the ERROR results which appear on FORM J.2(2) on page J-46. Each of the following problems will guide you through the computational procedures.

A total of ten students took a test with ten items. In computing percentages, ten will be the denominator.

1. What percentage of students made errors on test items 1-10? Enter them at the bottom of FORM J.2(2) on page J-46 and here.

1	2	3	4	5	6	7	8	9	10

2. How many errors did each student (a-j) make on the RECALL items? Enter your results on each row in the RECALL column and here.

a	b	c	d	e	f	g	h	i	j

3. How many errors did each student (a-j) make on the TRANSFER items? Enter your results on each in the TRANSFER column and here.

a	b	c	d	e	f	g	h	i	j

4. How many total errors did each student make? Enter a number for each student in the total column on FORM J.2(2) and here.

a	b	c	d	e	f	g	h	i	j

5. For each student, compute the percentage of errors he made on the total test.

a	b	c	d	e	f	g	h	i	j

SEE ANSWERS

ANSWERS

EXERCISE 4A

Your task is to summarize the ERROR results which appear on FORM J.2(2) on page J-46. Each of the following problems will guide you through the computational procedures.

A total of ten students took a test with ten items. In computing percentages, ten will be the denominator.

1. What percentage of students made errors on test items 1-10? Enter them at the bottom of FORM J.2(2) on page J-46 and here.

$\frac{10\%}{1}$	$\frac{10\%}{2}$	$\frac{0\%}{3}$	$\frac{10\%}{4}$	$\frac{20\%}{5}$	$\frac{20\%}{6}$	$\frac{60\%}{7}$	$\frac{20\%}{8}$	$\frac{30\%}{9}$	$\frac{20\%}{10}$

2. How many errors did each student (a-j) make on the RECALL items? Enter your results on each row in the RECALL column and here.

$\frac{0}{a}$	$\frac{2}{b}$	$\frac{0}{c}$	$\frac{0}{d}$	$\frac{0}{e}$	$\frac{1}{f}$	$\frac{0}{g}$	$\frac{0}{h}$	$\frac{1}{i}$	$\frac{1}{j}$

3. How many errors did each student (a-j) make on the TRANSFER items? Enter your results on each row in the TRANSFER column and here.

$\frac{2}{a}$	$\frac{2}{b}$	$\frac{1}{c}$	$\frac{0}{d}$	$\frac{3}{e}$	$\frac{0}{f}$	$\frac{1}{g}$	$\frac{1}{h}$	$\frac{4}{i}$	$\frac{1}{j}$

4. How many total errors did each student make? Enter a number for each student in the total column on FORM J.2(2) and here.

$\frac{2}{a}$	$\frac{4}{b}$	$\frac{1}{c}$	$\frac{0}{d}$	$\frac{3}{e}$	$\frac{1}{f}$	$\frac{1}{g}$	$\frac{1}{h}$	$\frac{5}{i}$	$\frac{2}{j}$

5. For each student, compute the percentage of errors he made on the total test.

$\frac{20\%}{a}$	$\frac{40\%}{b}$	$\frac{10\%}{c}$	$\frac{0\%}{d}$	$\frac{30\%}{e}$	$\frac{10\%}{f}$	$\frac{10\%}{g}$	$\frac{10\%}{h}$	$\frac{50\%}{i}$	$\frac{20\%}{j}$

DO NEXT PROBLEM

EXERCISE 40

Your task in this exercise is to compute additional "group" measures which describe the ERRORS committed on a test.

1. What percentage of the ten students had an error rate of more than 10%?
2. Does the program which led to these test results need revision? yes no
3. Using a denominator of 5, compute a percentage for each student which indicates his own error rate on RECALL items only.

<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
a	b	c	d	e	f	g	h	i	j
4. What percentage of the ten students made an error rate of more than 20% on the recall items?
5. Using a denominator of 5, compute a percentage for each student which indicates his own error rate on TRANSFER items only.

<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
a	b	c	d	e	f	g	h	i	j
6. What percentage of the ten students made an error rate of more than 30% on the transfer items?
7. Based on the discrepancy between the results for RECALL and TRANSFER items, what is the most likely problem? generalizations associations chains
8. If you were to do more detailed analyses of group results, which test item or test items would you select for further study? Check as many as you wish.

 1 2 3 4 5 6 7 8 9 10

SEE ANSWERS

ANSWERS

EXERCISE 4B

Your task in this exercise is to compute additional "group" measures which describe the ERRORS committed on a test.

1. What percentage of the ten students had an error rate of more than 10% 50%
2. Does the program which led to these test results need revision? X yes no
3. Using a denominator of 5, compute a percentage for each student which indicates his own error rate on RECALL items only.

$$\frac{05}{a} \quad \frac{40\%}{b} \quad \frac{02}{c} \quad \frac{05}{d} \quad \frac{05}{e} \quad \frac{05}{f} \quad \frac{05}{g} \quad \frac{20\%}{h} \quad \frac{20\%}{i} \quad \frac{20\%}{j}$$
4. What percentage of the ten students made an error rate of more than 20% on the recall items? 10%
5. Using a denominator of 5, compute a percentage for each student which indicates his own error rate on TRANSFER items only.

$$\frac{40\%}{a} \quad \frac{40\%}{b} \quad \frac{05}{c} \quad \frac{05}{d} \quad \frac{60\%}{e} \quad \frac{05}{f} \quad \frac{05}{g} \quad \frac{20\%}{h} \quad \frac{60\%}{i} \quad \frac{05}{j}$$
6. What percentage of the ten students made an error rate of more than 20% on the transfer items? 40%
7. Based on the discrepancy between the results for RECALL and TRANSFER items, what is the most likely problem? discriminations X generalizations associations chains
8. If you were to do more detailed analyses of group results, which test item or test items would you select for further study? Check as many as you wish.

$$\begin{array}{ccccccc} \frac{1}{1} & \frac{2}{2} & \frac{3}{3} & \frac{4}{4} & \frac{5}{5} & \frac{6}{6} & \frac{7}{7} & \frac{8}{8} & \frac{9}{9} & \frac{10}{10} \end{array}$$

DO NEXT PROBLEM

EXERCISE 4C

Your task in this exercise is to interpret group ERROR results on test items #7 and #9.

ITEM #/S	1	2	3	4	5	6	7	8	9	10
Options Endorsed										
omission							I		///	
ACTION I							//			
ACTION II							//			
ACTION III							I			
Total No. of Errors							6		3	

1. The most probable problem for test item #7 is:

- ___ a failure to acquire skills
- ___ systematic learning failure
- ___ unsystematic learning failure

2. The most probable problem for test item #9 is:

- ___ a failure to acquire skills
- ___ systematic learning failure
- ___ unsystematic learning failure

SEE ANSWERS

ANSWERS

EXERCISE 4C

Your task in this exercise is to interpret group ERROR results on test items #7 and #9.

ITEM #	1	2	3	4	5	6	7	8	9	10
Options Endorsed										
omission							I		III	
ACTION I							II			
ACTION II							II			
ACTION III							I			
Total No. of Errors							6	3		

1. The most probable problem for test item #7 is:

- ☐ a failure to acquire skills
- ☐ systematic learning failure
- ☒ unsystematic learning failure

2. The most probable problem for test item #9 is:

- ☒ a failure to acquire skills
- ☐ systematic learning failure
- ☐ unsystematic learning failure

FOLD BACK PAGE J-45

DO NEXT PROBLEM

These exercises are designed to give you practice analyzing the results for a single student on multiple test items.

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J-52 / J-53

Results for
INPUT
Class I

ITEM #'S	1	2	3	4	5	6	7	8	9	10	11	12
Options Endorsed	I	II	III	I	III	II	III	I	II	II	III	I
a ACTION I	X			X								
b ACTION II								X				X
c ACTION III												
d omission												
e	R	R	R	R	R	R	T	T	T	T	T	T

R = Recall
T = Transfer

Results for
INPUT
Class II

ITEM #'S	1	2	3	4	5	6	7	8	9	10	11	12
Options Endorsed	I	II	III	I	III	II	III	I	II	II	III	I
a ACTION I									X	X		
b ACTION II		X				X						
c ACTION III												
d omission												
e	R	R	R	R	R	R	T	T	T	T	T	T

Results for
INPUT
Class III

ITEM #'S	1	2	3	4	5	6	7	8	9	10	11	12
Options Endorsed	I	II	III	I	III	II	III	I	II	II	III	I
a ACTION I											X	
b ACTION II												
c ACTION III			X		X							
d omission												
e	R	R	R	R	R	R	T	T	T	T	T	T

EXERCISE 40

Your task is to summarize the results for RECALL items (only) as revealed by the template analysis on page J-54. The forms on page J-54 show all the student's answers (not his errors) on recall and transfer items.

CLASS OF ACTION TAKEN

	I	II	III	IV	V	omissions
I	correct					
II		correct				
III			correct			
IV				correct		
V					correct	

INPUT CLASSES

RECALL items

SUMMARY OF NO. OF ITEMS

	correct	omission	consistent	inconsistent
				mismatching
I				
II				
III				
IV				
V				

INPUT CLASS

RECALL PATTERN

	correct	omission	consistent	inconsistent
				mismatching
no classes				
some classes				
all classes				

- (1) Fill in the left-hand matrix showing the distribution of right and wrong responses to test items having an example from each of three INPUT classes; - THEN,
- (2) Fill in the summary matrix in the right-hand column; - THEN,
- (3) Fill in the matrix identifying the RECALL pattern.

SEE ANSWERS

EXERCISE 4D

		CLASS OF ACTION TAKEN						RECALL items		SUMMARY OF NO. OF ITEMS				
		I	II	III	IV	V	omissions			correct	omission	consistent	inconsistent	
												mismatching		
INPUT CLASSES	I	correct 2						INPUT CLASS	I	2				
	II		correct 2						II	2				
	III			correct 2					III	2				
	IV				correct				IV					
	V					correct			V					

		RECALL PATTERN				SUMMARY			
		no classes	some classes	all classes	correct	omission	consistent	inconsistent	
RECALL PATTERN	no classes								
	some classes								
	all classes	✓							

- DO NEXT PROBLEM

EXERCISE 4E

Your task is to summarize the results for TRANSFER items (only) as revealed by the template analysis on page J-54.

TRANSFER items

CLASS OF ACTION TAKEN

	I	II	III	IV	V	omissions
I	correct					
II		correct				
III			correct			
IV				correct		
V					correct	

INPUT CLASSES

SUMMARY OF NO. OF ITEMS

	correct	omission	consistent	inconsistent	mismatching
I					
II					
III					
IV					
V					

INPUT CLASS

TRANSFER PATTERN

	correct	omission	consistent	inconsistent	mismatching
no classes					
some classes					
all classes					

- (1) Fill in the left-hand matrix showing the distribution of right and wrong responses to test items having an example from each of three INPUT classes; - THEN,
- (2) Fill in the summary matrix in the right-hand column; - THEN,
- (3) Fill in the matrix identifying the TRANSFER pattern.

SEE ANSWERS

ANSWERS

EXERCISE 4E

Your task is to summarize the results for TRANSFER items (only) as revealed by the template analysis on page J-54.

TRANSFER items

CLASS OF ACTION TAKEN

	I	II	III	IV	V	omissions
I	correct	2				
II	2	correct				
III	1		correct			1
IV				correct		
V					correct	

INPUT CLASSES

SUMMARY OF NO. OF ITEMS

	correct	omission	consistent mismatching	inconsistent
I			2	
II			2	
III		1	1	
IV				
V				

INPUT CLASS

TRANSFER PATTERN

	correct	omission	consistent mismatching	inconsistent
no classes				
some classes				
all classes			✓	

- (1) Fill in the left-hand matrix showing the distribution of right and wrong responses to test items having an example from each of three INPUT classes; - THEN,
- (2) Fill in the summary matrix in the right-hand column; - THEN,
- (3) Fill in the matrix identifying the TRANSFER pattern.

DO NEXT PROBLEM

EXERCISE 4F

The RECALL and TRANSFER patterns obtained in the previous two exercises are reproduced here.

		consistent		inconsistent	
		correct	omission	mismatching	
RECALL PATTERN	no classes				
	some classes				
	all classes	✓			

		consistent		inconsistent	
		correct	omission	mismatching	
TRANSFER PATTERN	no classes				
	some classes				
	all classes			✓	

Referring to the tables on page 146 in HANDBOOK Section J, the above patterns suggest that the learning failure most likely to account for test results is:

___ discriminations ___ generalizations ___ associations

SEE ANSWERS

ANSWERS

EXERCISE 4F

The RECALL and TRANSFER patterns obtained in the previous two exercises are reproduced here.

		consistent		inconsistent	
		correct	omission	mismatching	
RECALL PATTERN	no classes				
	some classes				
	all classes	✓			

		consistent		inconsistent	
		correct	omission	mismatching	
TRANSFER PATTERN	no classes				
	some classes				
	all classes			✓	

Referring to the tables on page 146 in HANDBOOK Section J, the above patterns suggest that the learning failure most likely to account for test results is:

___ discriminations X generalizations ___ associations

END OF EXERCISE

NOW DO FINAL EXERCISE

#1

WHICH APPEARS IN THE
FINAL EXERCISES VOLUME

FOLD BACK THE BLUE PAGE

J-60 / J-61

FOLD OUT THIS PAGE AND
FOLLOW THE "I" SCHEDULE INSIDE

EXERCISES FOR TASK I

	After Reading HANDBOOK Sections	On HANDBOOK Pages	Do WORKBOOK Exercises	On WORKBOOK Pages	Type of Practice
1.	I.1.1 - I.2.1	1 - 116	1A - 1E	11 - 111	Developing practice i
2.	I.1.1 I.2.1	1 - 116	2A - 2B	113 - 117	Developing diagrams to assist performance on practice items
3.	I.1.1 I.2.1	1 - 116	3	119 - 123	Developing a diagram to teach concepts
4.	I.1.1 I.2.1	1 - 116	4A - 1E	125 - 135	Controlling the learn of a program
5.	I.2.2	117 - 137	5	137 - 143	Designing lean sequen
6.	*WHEN YOU HAVE COMPLETED ALL THE EXERCISES IN THIS SECTION OF THE WORKBOOK, PROCEED TO FINAL EXERCISE #2 IN THE <u>FINAL EXERCISES</u> VOLUME.				

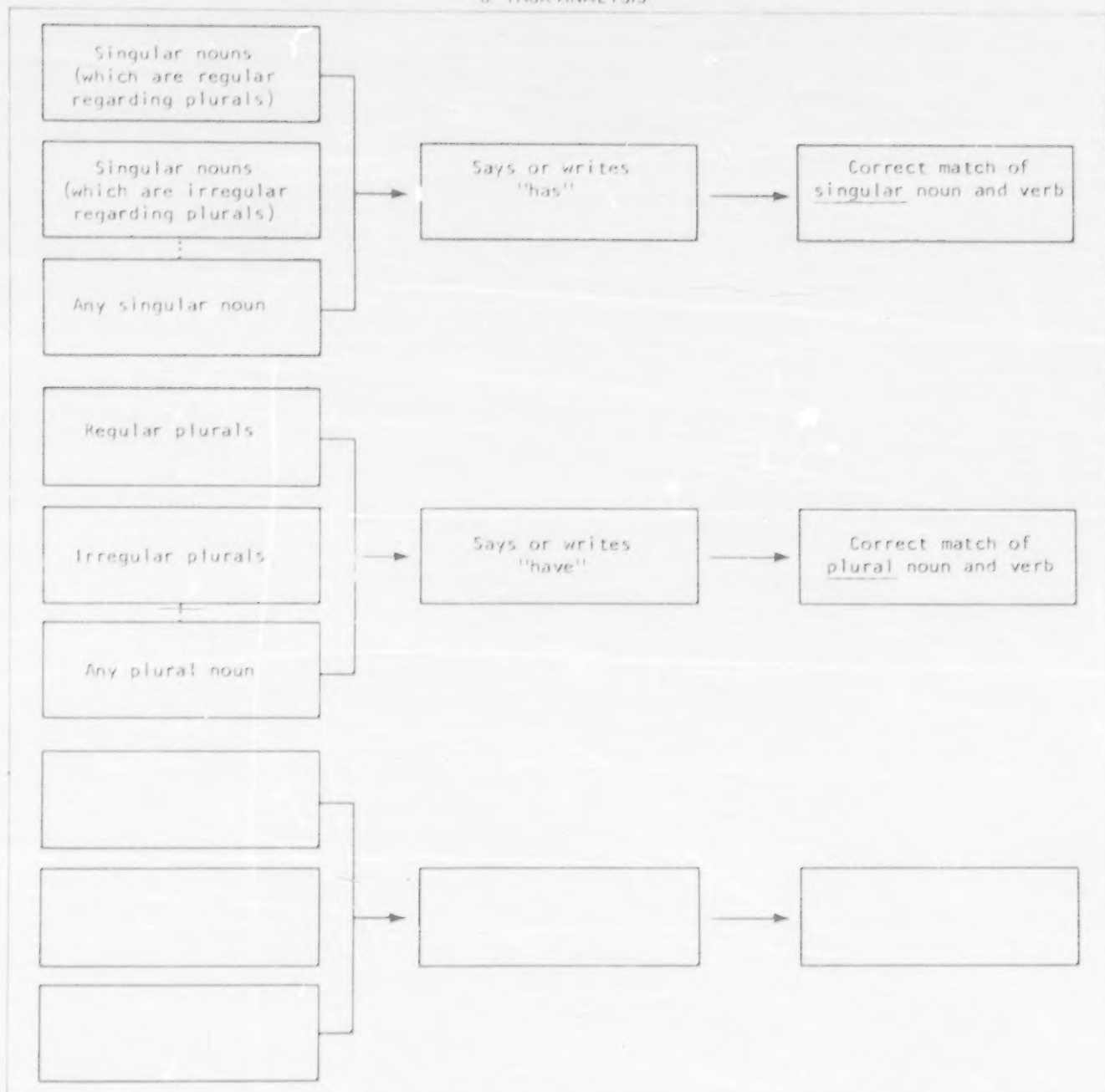
Exercises 1A-1E are designed to give you practice in doing two things:

- (1) Developing three types of practice items: recognition, editing, production; and
- (2) Developing practice items which vary in the amount of assistance provided to the student.

FOLD OUT THIS PAGE

Exercises 1A-1E are all based on the following task analysis diagram:

b. TASK ANALYSIS



EXERCISE 1A

For each problem below identify the version of the practice item which provides the least, the worst, and the intermediate amount of assistance to the student. Put a letter in each of the three answer columns.

AMOUNT OF ASSISTANCE

Least

Intermediate

Most

A.

B.

C.

1. Some plurals don't add "s" to the singular. For example, the plural of "louse" is "lice."
Which is the correct plural of mouse? ___mouses ___mice

Which is the correct plural of mouse? ___mouses ___mice

Some plurals don't add "s" to the singular.
Which is the correct plural of mouse? ___mouses ___mice

2. Match up the singulars and plurals of these nouns.
a. man ___children
b. woman ___men
c. child ___women

"Man" is singular. "Men" is plural.
Which is the plural for this example? ___women ___woman

Which is the plural? ___child ___children

3. If the word below is an incorrect plural, correct it; if it's O.K., do nothing.
mouses

The word below is an incorrect plural; correct it.
mouses

The plural of "louse" is "lice."
Correct this wrong plural.
mouses

4. What do you see here?
!!!!

Most plurals are formed by adding something to the singular.
What do you see here?
!!!!

Here are two question marks.
??
What do you see in this picture?
+++

5. (Given a picture) What does the boy have in his arms? (Make up a whole sentence)

(Given a picture) The boy ___ a dog in his arms.

(Given a picture) Use either "has" or "have."
The boy ___ a dog in his arms.

SEE ANSWERS

ANSWERS

EXERCISE 1A

For each problem below identify the version of the practice item which provides the least, the most, and the intermediate amount of assistance to the student. Put a letter in each of the three answer columns.

AMOUNT OF ASSISTANCE

Inter-

Least mediate Most

A.	B.	C.			
1. Some plurals don't add "s" to the singular. For example, the plural of "louse" is "lice." Which is the correct plural of mouse? _____ mice	Which is the correct plural of mouse? _____ mice	Some plurals don't add "s" to the singular. Which is the correct plural of mouse? _____ mice		B	A
2. Match up the singulars and plurals of these nouns. a. man _____ children b. woman _____ men c. child _____ women	"Man" is singular. "Men" is plural. Which is the plural for this example? _____ women	Which is the plural? _____ child _____ children		C	A B
3. If the word below is an incorrect plural, correct it; if it's O.K., do nothing. mouses	The word below is an incorrect plural; correct it. mouses	The plural of "louse" is "lice." Correct this wrong plural. mouses		A	B C
4. What do you see here? !!!	Most plurals are formed by adding something to the singular. What do you see here? !!!	Here are two question marks. ?? What do you see in this picture? +++		C	B A
5. (Given a picture) What does the boy have in his arms? (Make up a whole sentence) _____	(Given a picture) The boy _____ a dog in his arms.	(Given a picture) Use either "has" or "have." The boy _____ a dog in his arms.		B	A C

DO NEXT PROBLEM

EXERCISE 1B

The practice items below deal only with discriminating between and generalizing across singulars and plurals. Associations are not dealt with.

Your task is to develop practice items for the cells left blank in the form below. Be sure to use new examples of nouns.

	MAXIMUM ASSISTANCE	INTERMEDIATE ASSISTANCE	NO ASSISTANCE
RECOGNIZE	Most singular nouns are made plural by adding an "s" at the end. For example: <u>boy</u> is singular <u>boys</u> is plural Which of these is plural? <u>girl</u> <u>girls</u>	Plural nouns have a different ending than singular nouns. Which of these is plural? <u>dog</u> <u>dogs</u>	
EDIT	The word below is not plural the way it is now. Change it to a plural by adding an "s." <u>ship</u>	The word below is not plural the way it is now. Make it plural. <u>farmer</u>	
PRODUCE	Here are two circles.  What do you see in this picture? 	Remember the rule for making singular nouns plural. What do you see in this picture? 	 What do you see in this picture? _____

ANSWERS

EXERCISE 1B

The practice items below deal only with discriminating between and generalizing across singulars and plurals. Associations are not dealt with.

Your task is to develop practice items for the cells left blank in the form below. Be sure to use new examples of nouns.

	MAXIMUM ASSISTANCE	INTERMEDIATE ASSISTANCE	NO ASSISTANCE
RECOGNIZE	Most singular nouns are made plural by adding an "s" at the end. For example: boy is singular boys is plural Which of these is plural? __girl __girls	Plural nouns have a different ending than singular nouns. Which of these is plural? __dog __dogs	Which of these is plural: __cats __cat
EDIT	The word below is not plural the way it is now. Change it to a plural by adding an "s." __ship__	The word below is not plural the way it is now. Make it plural. __farmer__	If the word below is an incorrect plural, change it and make it plural. If it's O.K., leave it alone. __barns__
PRODUCE	Here are two circles.  What do you see in this picture? 	Remember the rule for making singular nouns plural. What do you see in this picture? 	 What do you see in this picture?

EXERCISE 1C

The practice items below deal only with discriminating between and generalizing across singulars and plurals. Associations are not dealt with.

Your task is to develop practice items for the cells left blank in the form below. Use "man," "woman," and "child" in your examples.

	MAXIMUM ASSISTANCE	INTERMEDIATE ASSISTANCE	NO ASSISTANCE
RECOGNIZE	Some singular nouns don't add an "s" to become plural. For example: <u>man</u> is singular <u>men</u> is plural Which of these is plural? <u>women</u> <u>woman</u>		
EDIT	The word below is the wrong plural for "woman." Change two letters and make it a correct plural. <u>womans</u>		
PRODUCE	Here are two men. (Picture of two men) What is in this picture? (Picture of two women)		

ANSWERS

EXERCISE 1C

The practice items below deal only with discriminating between and generalizing across singulars and plurals. Associations are not dealt with.

Your task is to develop practice items for the cells left blank in the form below. Use "man," "woman," and "child" in your examples.

	MAXIMUM ASSISTANCE	INTERMEDIATE ASSISTANCE	NO ASSISTANCE
RECOGNIZE	Some singular nouns don't add an "s" to become plural. For example: <u>man</u> is singular <u>men</u> is plural Which of these is plural? <u>women</u> <u>woman</u>	Remember the different rule for making plurals out of some nouns. Which of these is plural? <u>child</u> <u>children</u>	Which of these is plural? <u>man</u> <u>mans</u> <u>men</u> <u>mens</u>
EDIT	The word below is the wrong plural for "woman." Change two letters and make it a correct plural. <u>womans</u>	The word below is an incorrect plural because it uses an "s" ending. Change it to a correct plural. <u>childs</u>	If the word below is an incorrect plural, change it and make it a correct plural. If it's O.K., leave it alone. <u>man</u>
PRODUCE	Here are two men. (Picture of two men) What is in this picture? (Picture of two women)	Remember the new way to make plurals. (Picture of 4 boys and 3 girls) There are 7 "what" in this picture?	(Given a picture of two children, three men, and four women) Tell me what you see in the picture.

EXERCISE 1D

Based on the assumption that students can discriminate between singular and plural nouns, the practice items below deal only with associations.

Your task is to develop practice items for the cells left blank in the form below.

	MAXIMUM ASSISTANCE	INTERMEDIATE ASSISTANCE	NO ASSISTANCE
RECOGNIZE	You use "has" with singular nouns; you use "have" with plural nouns. For example: The girl has a dog. The girls have their own dogs. Which is correct? ☐ The man have a friend. ☐ The man has a friend.		
EDIT	The wrong form of the verb has been used in the two examples below. The man <u>have</u> a hat. The boys <u>has</u> a vacation.		
PRODUCE	(Given a picture of a boy with three dogs) Remember the rule about whether to use "has" or "have." Complete this sentence. The boy <u> </u> three dogs.		

ANSWERS

EXERCISE 10

Based on the assumption that students can discriminate between singular and plural nouns, the practice items below deal only with associations.

Your task is to develop practice items for the cells left blank in the form below.

RECOGNIZE

MAXIMUM ASSISTANCE

You use "has" with singular nouns; you use "have" with plural nouns.
For example:
The girl has a dog.
The girls have their own dogs.
Which is correct?
___ The man have a friend.
___ The man has a friend.

INTERMEDIATE ASSISTANCE

We saw:
The tree has leaves on it.
Which of these is correct?
___ The horses has hooves.
___ The horses have hooves.

NO ASSISTANCE

Which of these is correct?
___ The boy have a watch.
___ The boy has a watch.

EDIT

The wrong form of the verb has been used in the two examples below.
The man have a hat.
The boys has a vacation.

Remember singular and plural nouns use a different form of the verb "to have."
This is a wrong use.
Change it.
The cats has enough milk.

Edit the sentence below if it needs it.
The men has two cars to clean.



PRODUCE

(Given a picture of a boy with three dogs)
Remember the rule about whether to use "has" or "have."
Complete this sentence.
The boy ___ three dogs.

(Given a picture of a cowboy with three horses)
Make up a whole sentence and tell me: What does this cowboy have?

(Given a picture of a woman with two babies)
Complete this sentence.
The woman ___ two babies.

EXERCISE 1E

Fill in all the cells below for "discriminations and generalizations" regarding singulars and plurals of the words "dress," "dish," "stitch," "lunch," "glass," or any word ending in "x," "ch," or "s" which forms its plural by adding "es."

	MAXIMUM ASSISTANCE	INTERMEDIATE ASSISTANCE	NO ASSISTANCE
RECOGNIZE			
EDIT			
PRODUCE			

ANSWERS

EXERCISE 1E

Fill in all the cells below for "discriminations and generalizations" regarding singulars and plurals of the words "dress," "dish," "stitch," "lunch," "glass," or any word ending in "x," "ch," or "s" which forms its plural by adding "es."

	MAXIMUM ASSISTANCE	INTERMEDIATE ASSISTANCE	NO ASSISTANCE
RECOGNIZE	Most words ending in "x," "ch," "sh," or "s" form their plurals by adding "es" to the singular. For example: dish - dishes Which is plural? __stitch __stitches	Some words don't add just an "s" to the singular in order to make it plural. Which is plural? __lunches __lunchs	Which is the plural? __foxes __fox
EDIT	Most words ending in "x," "ch," "sh," or "s" form irregular plurals. This is a wrong plural. Correct it. dishs	This is a wrong plural. Correct it. stitchs	If the word below is plural, leave it alone; if not, make it plural. dress
PRODUCE	Two types of irregular plural endings are "ies" and "es." What is the plural of "sex"?	The word below takes an irregular ending on its plural form. What is the plural of "sketch"?	What is the plural of "box"?

FOLD BACK PAGE I-1

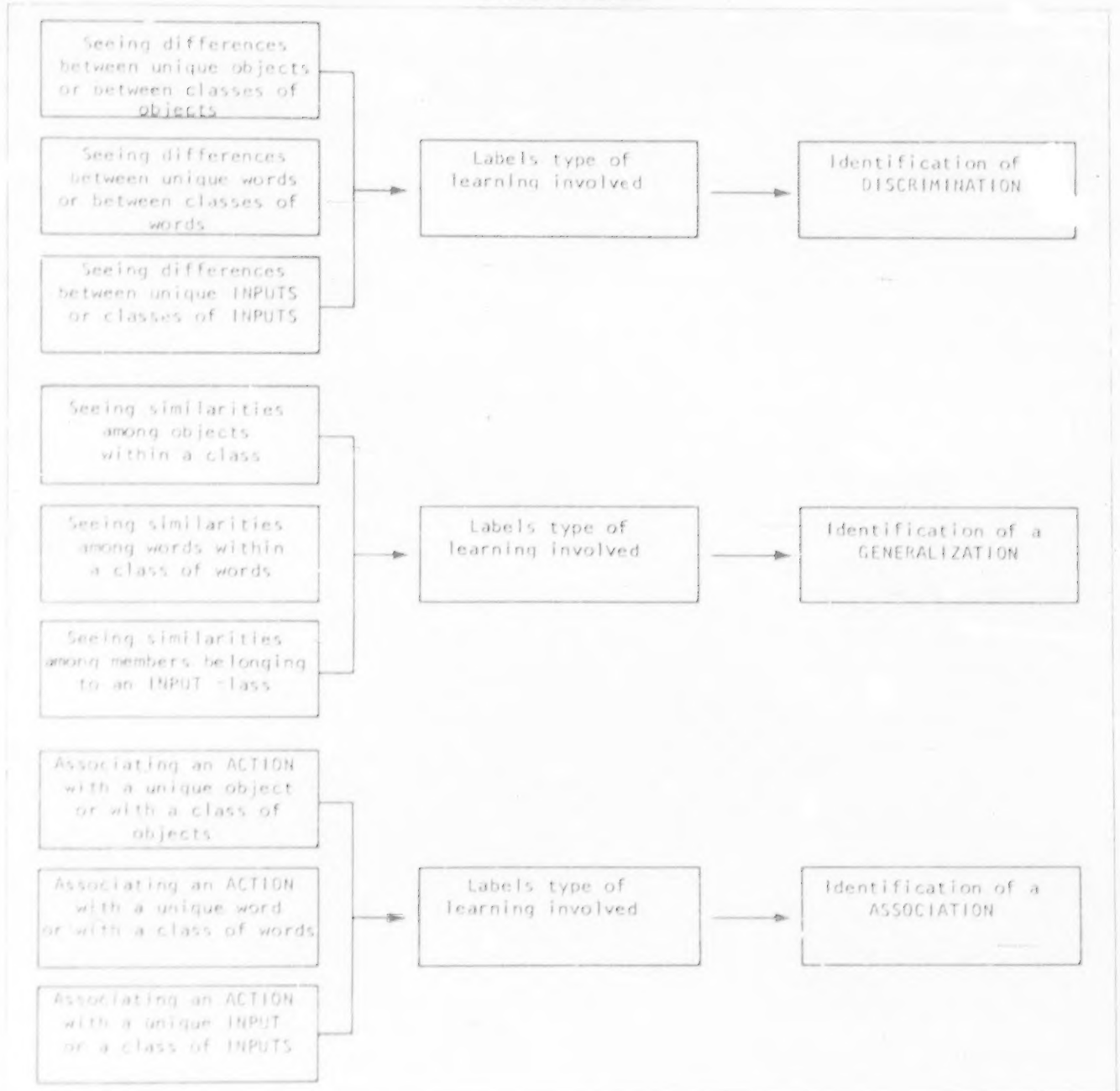
This exercise is designed to give you practice in doing two things:

- (1) Developing diagrams to be used in providing cuing to students while doing practice problems; and
- (2) Developing practice items to go with diagrams.

FOLD OUT THIS PAGE

Exercises 2A-2B are both based on the following task analysis diagrams:

b. TASK ANALYSIS



EXERCISE 2A

Your task is to fill in all the empty cells in this diagram. The diagram is intended to help the student to be able to identify examples of each of the concepts listed in the three columns. Develop your own examples.

CONCEPTS	DISCRIMINATIONS	GENERALIZATIONS	ASSOCIATIONS
Examples	Seeing the difference between: e.g., identical twins e.g., fingerprints e.g., triangles, squares, oblongs, etc. e.g., examples of fiscal or monetary policy	VS	VS
Definition			
DEFINING PROPERTIES	The ability to perceive the difference among: --Unique INPUTS --Classes of INPUTS Perception		
POSSIBLE VARIATIONS	INPUTS can be: --Physical (involving distance, height, weight, time, causal relations, etc.) --Conceptual (verbal/symbolic)		
	Seeing the difference between: e.g., "up" and "down" e.g., the "hour" hand and the "minute" hand e.g., finite and infinite numbers		

SEE ANSWERS

ANSWERS

EXERCISE 2A

Your task is to fill in all the empty cells in this diagram. The diagram is intended to help the student to be able to identify examples of each of the concepts listed in the three columns. Develop your own examples.

CONCEPTS	DISCRIMINATIONS	GENERALIZATIONS	ASSOCIATIONS
Examples	Seeing the <u>difference</u> between: e.g., identical twins e.g., fingerprints e.g., triangles, squares, ovals, etc. e.g., examples of fiscal or monetary policy	Seeing the <u>similarity</u> among: --Reds --Triangles (with different angles or size) --Class I levers	Attaching the right label to objects, people, events, or ideas: <u>calling by their right name</u> e.g., commas, semicolons, etc. Doing the right thing for a given signal
DEFINITION			
SEEKING PROPERTIES	The ability to perceive the <u>difference</u> among: --Unique INPUTS --Classes of INPUTS Perception	The ability to perceive the <u>similarity</u> among: --Members belonging to the same class of INPUTS	The ability to produce the correct ACTION for: --A unique INPUT --A class of INPUTS
POSSIBLE VARIATIONS	INPUTS can be: --Physical (involving distance, height, weight, time, causal relations, etc.) --Conceptual (verbal/symbolic)	Class members may have superficial physical similarity or non-visible functional similarity or a conceptual similarity	INPUT/ACTION associations can be mixtures of physical and conceptual INPUTS and ACTIONS: --Physical INPUT/ conceptual ACTION --Conceptual INPUT/ conceptual ACTION --Physical INPUT/ physical ACTION --Conceptual INPUT/ physical ACTION
	Seeing the difference between: e.g., "up" and "down" e.g., the "hour" hand and the "minute" hand e.g., "finite" and "infinite" numbers	Seeing the similarity among: e.g., "four" vs. "4," "OK," "yes," or "checked" (internal signals) e.g., examples of Romantic music e.g., examples of "happy"	Attaching the right ACTION to INPUTS e.g., calling an example of a book a "book" e.g., using a comma for an example of a non-restrictive clause e.g., applying Ohm's Law to an problem requiring it

EXERCISE 2B.

Based on the diagram on answer page I-15, your task is to develop seven problems giving your students practice in identifying examples of discriminations, generalizations, and associations. Invent your own examples.

Three examples are provided. Distribute your examples approximately evenly over the three types of learning.

Develop practice items similar to these sample ones.			
	Discriminations	Generalizations	Associations
1. Telling the difference between examples of "finite" numbers and of "infinite" numbers.	X		
2. Seeing the similarity between varied examples of "finite" numbers.		X	
3. Calling an example of a "finite" number "a finite number" and an example of an infinite number "an infinite number."			X
4.			
5.			
6.			
7.			
8.			
9.			
10.			

ANSWERS

EXERCISE 2B

Based on the diagram on answer page I-15, your task is to develop seven problems giving your students practice in identifying examples of discriminations, generalizations, and associations. Invent your own examples.

Three examples are provided. Distribute your examples approximately evenly over the three types of learning.

Develop practice items similar to these sample ones.			
	Discriminations	Generalizations	Associations
1. Telling the difference between examples of "finite" numbers and of "infinite" numbers.	X		
2. Seeing the similarity between varied examples of "finite" numbers.		X	
3. Calling an example of a "finite" number "a finite number" and an example of an infinite number "an infinite number."			X
4. Feeling the difference between "linen" and "lace."	X		
5. Hearing the difference between music played with consistent rhythm and that played with varied rhythm.	X		
6. Seeing the similarity (or "redness") among shades of red.		X	
7. Seeing the similarity among varied (and seemingly different) Class II levers.		X	
8. Seeing the similarity among varied classroom situations (all of which call for ignoring behavior).		X	
9. Calling an example of an "infinite number" by that term and an example of a "finite number" by that term.			X
10. Responding with reinforcement (taking an ACTION) for desirable behavior and withholding reinforcement for undesirable behavior.			X

After reading
Handbook for
sub STEP(S)

1.1.1-1.2.1

DO
EXERCISE

3

This exercise is designed to give you practice in developing a diagram to teach concepts and to develop problems to go with the diagram.

- On the next two pages are blank forms which you will use to teach your students how to identify (and label) nouns and verbs. FILL IN BOTH PAGES.
- If necessary, consult an English book as you would ordinarily do for subject matter with which you were not completely familiar.
- Assume a target audience of elementary grade students.

TURN TO NEXT PAGE FOR PROBLEMS

CONCEPTS	▶	NOUNS		VERBS	
Examples	▶		VS.		
Definition					

DEFINING PROPERTIES	▷		
POSSIBLE VARIATIONS	▷		
OTHER EXAMPLES	▷		

Is the underlined word in the sentence a noun or verb?

NOUN

VERB

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

ANSWERS

CONCEPTS	NOUNS	VERBS
Examples	dog boy Charles honesty house	walks talks multiplies sings wrote left is has will have will be has walked
Definition		
DEFINING PROPERTIES	The <u>name</u> for: objects people events ideas	-Words that show what the <u>subject</u> of a sentence <u>is doing</u> -Words that tell something about the <u>subject</u> of a sentence
POSSIBLE VARIATIONS	-Can be the <u>subject</u> of a sentence and comes <u>before</u> the verb: ••The <u>man</u> hit the punching bag. ••The tall <u>boy</u> rode his bike. -Can be the <u>object</u> of a verb and come <u>after</u> the verb: ••The man hit the punching <u>bag</u>. ••The tall boy rode his <u>bike</u>.	-Can be in <u>any</u> tense (present, past, future) -Can be near the <u>beginning</u> or near the <u>end</u> of a sentence or in the <u>middle</u>
OTHER EXAMPLES	The <u>truth</u> is hard to believe. Bob<u>by</u> <u>went</u> back early. Then <u>called</u> to the <u>dog</u>. She <u>talked</u> about the <u>poem</u>.	The truth <u>is</u> hard to believe. Bob<u>by</u> <u>went</u> back early. Then <u>called</u> to the dog. She <u>talked</u> about the poem.

ANSWERS

	Is the underlined word a noun or verb?	NOUN	VERB
1.	He <u>piled</u> his books high.		X
2.	<u>Talking</u> all the time was his problem.		X
3.	He couldn't find any to help him <u>pack</u> .		X
4.	The building burned to the <u>ground</u> .	X	
5.	The <u>doctor</u> did a complete examination.	X	
6.	The horse <u>ran</u> away.		X
7.	The <u>wind</u> blew at forty miles an hour.	X	
8.	He told the <u>man</u> to come in the house.	X	
9.	He <u>was</u> sick all day.		X
10.	The <u>tailor</u> repaired the suit.	X	

After reading
Handbook for
sub-STEP(S)

I.1.1-I.2.1

DO
EXERCISE

4

Exercises 4A-4E are designed to give you practice in using various techniques to control the leanness of an instructional sequence.

FOLD OUT THIS PAGE

Figure I

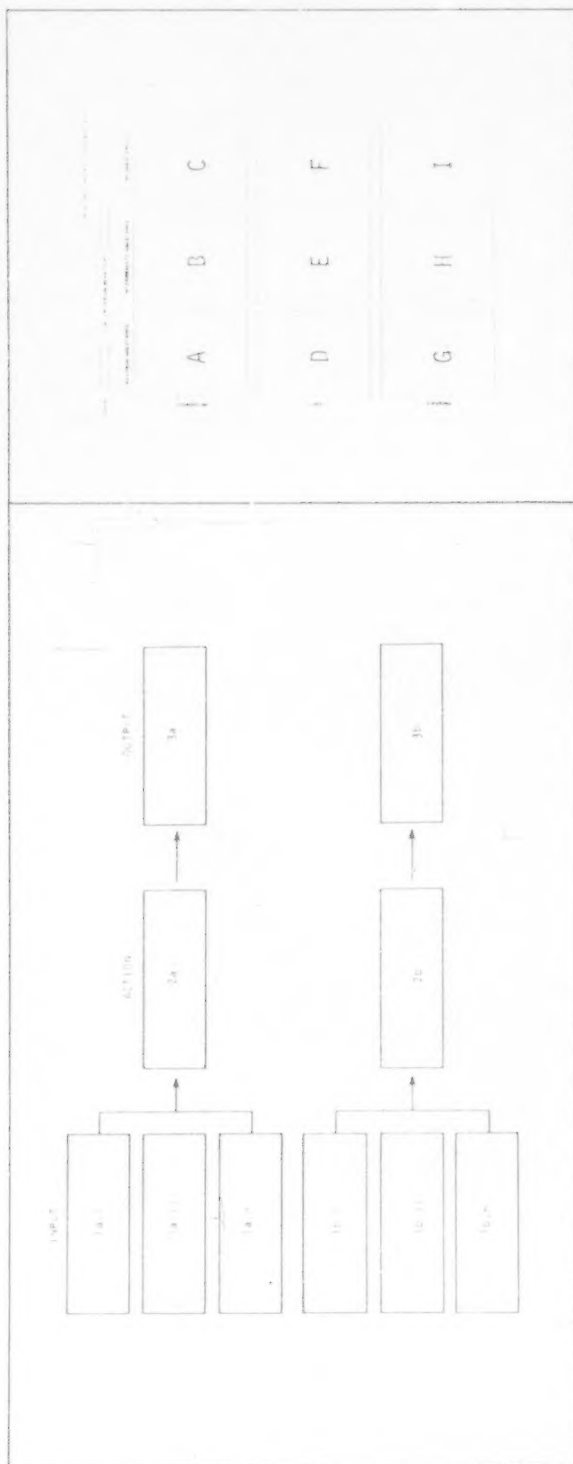


Figure II



The variables which you can manipulate to control the leanness of the above instructional sequence include:

- The number of practice items
- The number of examples used
- The number of repetition items
- The number of review items
- The amount of assistance provided by cues
- The speed of fading out of cues
- How much is practiced at the same time

EXERCISE 4A

Your task in this exercise is to put an X through the example which represents a leaner instructional sequence.

Leanness Affected By:

1.	Number of <u>practice</u> items	Figure I There is <u>one</u> practice item representing INPUT cells: la.i, la.ii, and lb.ii	Figure I There is <u>one</u> practice item representing INPUT cells: la.i, la.ii, and lb.ii
2.	Number of <u>practice</u> items	Figure I There are <u>5</u> practice items representing TRANSFER cells la.n and lb.n	Figure I There are <u>8</u> practice items representing TRANSFER cells la.n and lb.n
3.	Number of <u>examples</u>	Figure I There are <u>9</u> practice items, each with a different example of either INPUT class la or lb	Figure I There are <u>12</u> practice items, each with a different example of either INPUT class la or lb
4.	Number of <u>examples</u>	Figure II There is <u>one</u> of each type of practice item <u>A-I</u>	Figure II There is <u>one</u> of each of the following types of practice items: A, B, C, D, E, F, G, H, I
5.	Number of <u>examples</u>	Figure II There are the following numbers of items: A-E - 1 item each F-H - 2 items each I - 4 items	Figure II There is <u>one</u> of each type of practice item A-I

SEE ANSWERS

ANSWERS

EXERCISE 4A

Your task in this exercise is to put an X through the example which represents a leaner instructional sequence.

Leanness Affected By:

1.	Number of <u>practice items</u>	Figure I There is <u>one</u> practice item representing <u>INPUT</u> cells la.i, la.ii, and lb.ii	Figure I There is <u>one</u> practice item representing <u>INPUT</u> cells la.i, la.ii, and lb.ii
2.	Number of <u>practice items</u>	Figure I There are <u>5</u> practice items representing <u>TRANSFER</u> cells la.n and lb.n	Figure I There are <u>8</u> practice items representing <u>TRANSFER</u> cells la.n and lb.n
3.	Number of <u>examples</u>	Figure I There are <u>9</u> practice items, each with a <u>different</u> example of either <u>INPUT</u> class la or lb	Figure I There are <u>12</u> practice items, each with a <u>different</u> example of either <u>INPUT</u> class la or lb
4.	Number of <u>examples</u>	Figure II There is one of each type of practice <u>item A-I</u>	Figure II There is one of each of the following <u>types</u> of practice items: A, B, C, D, E, F, G, H, I
5.	Number of <u>examples</u>	Figure II There are the following number of items: A-E - 1 item each F-H - 2 items each I - 4 items	Figure II There is one of each type of practice <u>item A-I</u>

DO NEXT PROBLEM

EXERCISE 4B

Your task in this exercise is to put an X through the example which represents a leaner instructional sequence.

Leanness Affected By:

1.	Number of <u>repetition</u> items	Figure 1 INPUT la.ii appears in <u>three</u> practice items	Figure 1 INPUT la.ii appears in <u>two</u> practice items
2.	Number of <u>repetition</u> items	Figure 1 Each INPUT to be recalled has 2 practice items devoted to it	Figure 1 Some INPUTS to be recalled have 2 practice items and some 3 practice items devoted to them
3.	Number of <u>examples</u>	Figure 1 INPUT class la is represented by practice items with 2 transfer examples, <u>lb</u> by 3 transfer examples	Figure 1 INPUT class la is represented by practice items with 4 transfer examples, <u>lb</u> by 6 transfer examples
4.	Number of <u>review</u> items	Figure 1 INPUTS la.i, lb.i, lb.ii, and 3 TRANSFER INPUTS are reviewed in one practice item (each)	Figure 1 All <u>recall</u> INPUTS and five <u>transfer</u> INPUTS are reviewed in one practice item (each)
5.	Number of <u>review</u> items	Figure 1 <u>Three</u> review practice items appear at three different times in an instructional sequence	Figure 1 <u>Three</u> review practice items appear at two different times in an instructional sequence

SEE ANSWERS

ANSWERS

EXERCISE 4B

Your task in this exercise is to put an X through the example which represents a leaner instructional sequence.
 Leanness Affected By:

1.	Number of <u>repetition</u> items	Figure 1 INPUT la.ii appears in <u>three</u> practice items	Figure 1 INPUT la.ii appears in <u>two</u> practice items
2.	Number of <u>repetition</u> items	Figure 1 Each INPUT to be recalled has 2 practice items devoted to it	Figure 1 Some INPUTS to be recalled have 2 practice items and some 3 practice items devoted to them
3.	Number of <u>examples</u>	Figure 1 INPUT class la is represented by practice items with 2 transfer examples, lb by 3 transfer examples	Figure 1 INPUT class la is represented by practice items with 4 transfer examples, lb by 6 transfer examples
4.	Number of <u>review</u> items	Figure 1 INPUTS la.i, lb.i, lb.ii, and 3 TRANSFER INPUTS are reviewed in one practice item (each)	Figure 1 All recall INPUTS and five transfer INPUTS are reviewed in one practice item (each)
5.	Number of <u>review</u> items	Figure 1 Three review practice items appear at <u>three</u> different times in an instructional sequence	Figure 1 Three review practice items appear at <u>two</u> different times in an instructional sequence

DO NEXT PROBLEM

EXERCISE 4C

Your task in this exercise is to make a change in an instructional sequence making it leaner.

Leanness Affected By:	INSTRUCTIONAL SEQUENCE NOW	Your Change
1. Number of <u>repetition</u> items	Figure I There are two practice items for each of the following INPUTS: la.i, la.ii, lb.i, and lb.ii	
2. Number of <u>examples</u>	Figure I There are practice items containing transfer examples: 3 for INPUT class la and 4 for INPUT class lb	
3. Number of <u>review</u> items	Figure I Each recall example and each transfer example used is reviewed on two separate occasions	
4. Number of <u>examples</u>	Figure I The INPUT classes are represented by a series of 20 practice items, each containing a different example	
5. Number of <u>practice</u> items	Figure II Each type of practice item (A-I) is represented by three practice items	

SEE ANSWERS

ANSWERS

EXERCISE 4C

Your task in this exercise is to make a change in an instructional sequence making it leaner.

Leanness Affected By:

INSTRUCTIONAL SEQUENCE NOW

Your Change

1. Number of <u>repetition</u> items	Figure I There are two practice items for each of the following INPUTS: 1a.i, 1a.ii, 1b.i, and 1b.ii	A reduction of just one repetition for one INPUT will make it leaner
2. Number of <u>examples</u>	Figure I There are practice items containing transfer examples: 3 for INPUT class 1a and 4 for INPUT class 1b	A reduction of just one example of either INPUT class will make it leaner
3. Number of <u>review</u> items	Figure I Each recall example and each transfer example used is reviewed on two separate occasions	A reduction of a review item for just one recall or just one transfer example will make it leaner
4. Number of <u>examples</u>	Figure I The INPUT classes are represented by a series of 20 practice items, each containing different example	Nineteen practice items would make it leaner
5. Number of <u>practice</u> items	Figure II Each type of practice item (A-I) is represented by three practice items	A reduction of just one item for any of the types would make it leaner

DO NEXT PROBLEM

EXERCISE 40

Your task in this exercise is to put an X through the example which represents a leaner instructional sequence.

Leanness Affected By:

1. Amount of assistance provided	Figure II Practice item is of type: B _	Figure II Practice item is of type: C _
2. Amount of assistance provided	Figure II Practice item is of type: D _	Figure II Practice item is of type: E _
3. Speed of fading	Figure II Instructional sequence proceeds from Cell A directly to Cell E (omitting B, C, and D)	Figure II Instructional sequence proceeds from Cell A directly to Cell D (omitting B and C)
4. Speed of fading	Figure II Instructional sequence uses all types of Cells A-I	Figure II Instructional sequence uses Cells A, B, C, G, H, I
5. Speed of fading	Figure II Instructional sequence uses 3 type G practice items before proceeding to the H type	Figure II Instructional sequence uses 1 type G practice item before proceeding to the H type

SEE ANSWERS

Leanness Affected By:

1. Amount of assistance provided

2. Amount of assistance provided

3. Speed of fading

4. Speed of fading

5. Speed of fading

Figure II
Practice item is of type:
B

Figure II
Practice item is of type:
D

Figure II
Instructional sequence proceeds from Cell A directly to Cell E (omitting B, C, and D)

Figure II
Instructional sequence uses all types of Cells A-I

Figure II
Instructional sequence uses 3 type-G practice items before proceeding to the H type

Figure II
Practice item is of type:
C

Figure II
Practice item is of type:
E

Figure II
Instructional sequence proceeds from Cell A directly to Cell D (omitting B and C)

Figure II
Instructional sequence uses Cells A, B, C, G, H, I

Figure II
Instructional sequence uses 1 type G practice item before proceeding to the H type

DO NEXT PROBLEM

EXERCISE 4E

Your task in this exercise is to make a change in an instructional sequence making it leaner.

Leanness Affected By:	INSTRUCTIONAL SEQUENCE NOW	Your Change
1. Amount of assistance	Figure II Type G item used	
2. Amount of assistance	The student is allowed to refer to a diagram as he works on practice items containing examples from the diagram	
3. Speed of fading	Figure II The sequence goes thus: A, B, C, E	
4. Speed of fading	Figure II The sequence uses all cells but has <u>two</u> each of B, E, and H <u>before</u> going to C, F, and I	
5. Speed of fading	The student uses a diagram as he works on twenty practice items; then, without it, on twenty	

ANSWERS

EXERCISE 4E

Your task in this exercise is to make a change in an instructional sequence making it leaner.

Leanness Affected By:

INSTRUCTIONAL SEQUENCE NOW

Your Change

1. Amount of assistance	Figure II Type G item used	A type H on time I item would make it <u>leaner</u>
2. Amount of assistance	The student is allowed to refer to a diagram as he works on practice items containing examples from the diagram	Withdraw the diagram; require practice without it; OR Have him work on examples <u>not</u> in the diagram
3. Speed of fading	Figure II The sequence goes thus: A, B, C, E	Leaner sequences possible: -A, B, C, F (or later -A, B, E -A, E
4. Speed of fading	Figure II The sequence uses all cells but has two each of B, E, and H before going to C, F, and I	Use only one each of B, E, and H before going to C, F, and I
5. Speed of fading	The student uses a diagram as he works on twenty practice items; then, without it on twenty	Diagram is withdrawn when student completes <u>less</u> than the first twenty items

FOLD BACK PAGE I-25

END OF EXERCISE

This exercise is designed to give you practice in designing an instructional sequence that is lean by virtue of how much is practiced at the same time.

TURN TO NEXT PAGE FOR PROBLEMS

EXERCISE 5A

Your task in this exercise is to put an X through the example which represents a learner instructional sequence.

Learnness Affected By:

1. Shaping: Size of jump	Criterion behavior contains 17 Sub-STEPS: First <u>two</u> Sub-STEPS are practiced together	Criterion behavior contains 17 Sub-STEPS: First <u>four</u> Sub-STEPS are practiced together	Criterion behavior contains 17 Sub-STEPS: First <u>two</u> Sub-STEPS are practiced together
2. Shaping: Number of practice items	Criterion behavior contains 17 Sub-STEPS: There are five practice items for the <u>first four</u> Sub-STEPS (practiced together)	Criterion behavior contains 17 Sub-STEPS: There are eight practice items for the <u>first four</u> Sub-STEPS (practiced together)	Criterion behavior contains 17 Sub-STEPS: There are eight practice items for the <u>first four</u> Sub-STEPS (practiced together)
3. Backward chaining: Size of group	Criterion behavior contains 17 Sub-STEPS: The last <u>two</u> Sub-STEPS are practiced together	Criterion behavior contains 17 Sub-STEPS: The last <u>two</u> Sub-STEPS are practiced together	Criterion behavior contains 17 Sub-STEPS: The last three Sub-STEPS are practiced together
4. Backward chaining: Number of practice items	Criterion behavior contains 17 Sub-STEPS: There are fifteen practice items for the last <u>three</u> Sub-STEPS (practiced together)	Criterion behavior contains 17 Sub-STEPS: There are fifteen practice items for the last <u>three</u> Sub-STEPS (practiced together)	Criterion behavior contains 17 Sub-STEPS: There are ten practice items for the last three Sub-STEPS (practiced together)
5. Size of group and number of practice items	Criterion behavior contains 17 Sub-STEPS: The first <u>three</u> Sub-STEPS (practiced together), <u>twenty-two</u> practice items	Criterion behavior contains 17 Sub-STEPS: The first <u>three</u> Sub-STEPS (practiced together), <u>twenty-two</u> practice items	Criterion behavior contains 17 Sub-STEPS: 1st Sub-STEP - 3 items 2nd Sub-STEP - 4 items 3rd Sub-STEP - 5 items

SEE ANSWERS

ANSWERS

EXERCISE 5A

Your task in this exercise is to put an X through the example which represents a learner instructional sequence.

Leanness Affected By:

1. Shaping: Size of jump

~~Criterion behavior contains
17 Sub-STEPS: First four
Sub-STEPS are practiced
together~~

Criterion behavior contains
17 Sub-STEPS: First two
Sub-STEPS are practiced
together

2. Shaping: Number of practice
items

~~Criterion behavior contains
17 Sub-STEPS: There are
five practice items for the
first four Sub-STEPS
(practiced together)~~

Criterion behavior contains
17 Sub-STEPS: There are
eight practice items for the
first four Sub-STEPS
(practiced together)

3. Backward chaining: Size of
group

Criterion behavior contains
17 Sub-STEPS: The last two
Sub-STEPS are practiced
together

~~Criterion behavior contains
17 Sub-STEPS: The last
three Sub-STEPS are
practiced together~~

4. Backward chaining: Number
of practice items

Criterion behavior contains
17 Sub-STEPS: There are
fifteen practice items for
the last three Sub-STEPS
(practiced together)

~~Criterion behavior contains
17 Sub-STEPS: There are
ten practice items for the
last three Sub-STEPS
(practiced together)~~

5. Size of group and number of
practice items

Criterion behavior contains
17 Sub-STEPS: The first
three Sub-STEPS (practiced
together); twenty-two
practice items

~~Criterion behavior contains
17 Sub-STEPS:
1st Sub-STEP - 3 items
2nd Sub-STEP - 4 items
3rd Sub-STEP - 5 items~~

DO NEXT PROBLEM

EXERCISE 5B

Your task in this exercise is to suggest a way to make it easier for the learner to practice parts of the criterion behavior and still keep the exercise relatively lean.
Put an X through the better of the two approaches suggested for each situation.

Students Cannot Handle
This Present Arrangement

YOUR RECOMMENDED CHANGE

Approach A

Approach B

1. Sub-Criterion behaviors #'s 1, 2, and 3; 4 and 5

Break up 1, 2, and 3 into 1 and 2, and 3

Keep 1, 2, and 3, but add assistance (cuing)

2. Sub-Criterion behaviors #'s 1 and 2 separately

Break #1 up into all its separate sub-components

Break #1 up into groupings of at least two sub-components

3. Sub-Criterion behavior #3 in its entirety

Keep #3 in its entirety but add assistance

Break #3 up into grouped sub-components

4. Sub-Criterion behaviors #'s 7 and 8 together

Sub-Criterion behavior #7 in its entirety, and #8 in its entirety

Break #7 up into its sub-components (grouped)

5. Sub-Criterion behaviors #'s 15, 14, and 13 together (backward chaining)

Break up into #15 alone, then #14 alone, then #13 alone

Break up into #15 and #14 together; then, #13

ANSWERS

EXERCISE 5B

Your task in this exercise is to suggest a way to make it easier for the learner to practice parts of the criterion behavior and still keep the exercise relatively lean.

Put an X through the better of the two approaches suggested for each situation.

Students Cannot Handle
This Present Arrangement

YOUR RECOMMENDED CHANGE

Approach A

Approach B

1. Sub-Criterion behaviors #'s 1, 2, and 3; 4 and 5

Break up 1, 2, and 3 into 1 and 2, and 3

~~Keep 1, 2, and 3, but add assistance (cuing)~~

2. Sub-Criterion behaviors #'s 1 and 2 separately

Break #1 up into all its separate sub-components

~~Break #1 up into groupings of at least two sub-components~~

3. Sub-Criterion behavior #3 in its entirety

~~Keep #3 in its entirety but add assistance~~

Break #3 up into grouped sub-components

4. Sub-Criterion behaviors #'s 7 and 8 together

~~Sub-Criterion behavior #7 in its entirety, and #8 in its entirety~~

Break #7 up into its sub-components (grouped)

5. Sub-Criterion behaviors #'s 15, 14, and 13 together (backward chaining)

Break up into #15 alone, then #14 alone, then #13 alone

~~Break up into #15 and #14 together, then, #13~~

DO NEXT PROBLEM

EXERCISE 5C

Your task in this exercise is to make a change in planned sequences in order to make it easier for the learner, yet keeping it as lean as possible.

INSTRUCTION NOW	A MINIMAL Change in Leanness	A Somewhat More Drastic Effect on Leanness
1. Two Sub-STEPS are practiced together in their entirety		
2. One Sub-STEP is practiced in its entirety		
3. One Sub-STEP (or one Sub-Criterion behavior) is practiced in groupings of sub-components		
4. Four Sub-Criterion behaviors (or four Sub-STEPS) are treated together		
5. Each sub-component in a Sub-STEP is treated separately		

SEE ANSWERS

ANSWERS

EXERCISE 5C

Your task in this exercise is to make a change in planned sequences in order to make it easier for the learner, yet keeping it as lean as possible

INSTRUCTION NOW

A MINIMAL Change in Leanness

A Somewhat More Drastic Effect on Leanness

1. Two Sub-STEPS are practiced together in their entirety

Assistance (cuing) is added, and the two Sub-STEPS are still practiced together

Splitting up the practice so that each Sub-STEP is practiced separately

2. One Sub-STEP is practiced in its entirety

Assistance is added (with the Sub-STEP still practiced in its entirety)

The Sub-STEP is split up into its components, and then are practiced in groupings

3. One Sub-STEP (or one Sub-Criterion behavior) is practiced in groupings of sub-components

Assistance is added, and practice of groupings of sub-components is retained

Each sub-component is treated separately

4. Four Sub-Criterion behaviors (or four Sub-STEPS) are treated together

Treated the same way but with added cuing or assistance

Three of the Sub-Criterion behaviors are treated together; the fourth is treated by itself and in its entirety

5. Each sub-component in a Sub-STEP is treated separately

Treat the same way but add least amount of assistance necessary

Treat the same way but add stronger assistance or fade later

NOW DO FINAL EXERCISE

#2

WHICH APPEARS IN THE
FINAL EXERCISES VOLUME

FOLD BACK THE BLUE PAGE

I-44 / I-45

FOLD OUT THIS PAGE AND
FOLLOW THE "G" SCHEDULE INSIDE

EXERCISES FOR TASK G

	After Reading HANDBOOK Sections	On HANDBOOK Pages	Do WORKBOOK Exercises	On WORKBOOK Pages	Type of Practice
1.	G.1.1	1 - 13	1	G1 - G3	Organizing collection c FORMS
2.	G.1.2	15 - 29	2	G5 - G7	Completing FORM G.1(1)
3.	G.1.3	31 - 49	3	G9 - G11	Completing Section 1A of FORM G.1(2)
4.	G.1.4	51 - 61	4	G13 - G15	Completing Section 1B of FORM G.1(2)
5.	G.2.1	65 - 121	5A - 5N	G17 - G45	Developing preparatory practice progressions
6.	G.2.2	122 - 155	6A - 6G	G47 - G75	Developing preparatory practice progressions f selected learning probl
7.	G.2.3 - G.3.2	157 - 201	7A - 7C	G77 - G83	Designing feedback
8.	G.3.3 - G.3.4	203 - 227	8A - 8C	G85 - G91	Designing the deliver of reinforcement
9.	G.4.1 - G.4.2	229 - 267	9A - 9E	G95 - G105	Identifying media requirements

10. **WHEN YOU HAVE COMPLETED ALL THE EXERCISES IN THIS SECTION OF THE WORKBOOK,
PROCEED TO FINAL EXERCISE #3 IN THE FINAL EXERCISES VOLUME.*

After reading
Handbook for
sub-STEP(S)

G.1.1

DO
EXERCISE

1

This exercise is designed to give you practice identifying the number of forms you would have to collect and organize for a criterion behavior.

TURN TO NEXT PAGE FOR PROBLEMS

EXERCISE 1

On the left is a description of a criterion behavior and the sub-STEPS associated with it. On the right is a list of FORMS you will have completed for the criterion behavior by the time you get to TASK "6."

In the blanks indicate how many separate forms you would have gathered together for each type of analysis listed.

FORMS

Criterion Behavior:

Given an engine with a fouling spark plug, the student will locate the misfiring spark plug using a vacuum gauge.

Sub-STEPS:

1. Connect vacuum gauge to intake manifold.
2. Start engine and run at idle rpm.
3. Disconnect one plug cable with insulated pliers.
4. Repeat Step 4 on each plug wire. If gauge reading does not change, plug is not firing.
5. Remove gauge and adaptor. Put them away.

Task analysis	_____
Criterion objective	_____
Criterion tests	_____
Simulation plan	_____
Preparatory objective	_____
Learning analysis	_____
Mode analysis	_____
Competency analysis	_____
Task description	_____
Audience analysis	_____

SEE ANSWERS

ANSWERS

EXERCISE 1

On the left is a description of a criterion behavior and the sub-STEPS associated with it. On the right is a list of FORMS you will have completed for the criterion behavior by the time you get to TASK "G."

In the blanks indicate how many separate forms you would have gathered together for each type of analysis listed.

FORMS

Criterion Behavior:

Given an engine with a fouling spark plug, the student will locate the misfiring spark plug using a vacuum gauge.

Sub-STEPS:

1. Connect vacuum gauge in intake manifold.
2. Start engine and run at idle rpm.
3. Disconnect one plug cable with insulated pliers.
4. Repeat Step 4 on each plug wire. If gauge reading does not change, plug is not firing.
5. Remove gauge and adaptor. Put them away.

Task analysis	<u>5</u>
Criterion objective	<u>1</u>
Criterion tests	<u>1</u>
Simulation plan	<u>1</u>
Preparatory objective	<u>5</u>
Learning analysis	<u>5</u>
Mode analysis	<u>5</u>
Competency analysis	<u>5</u>
Task description	<u>5</u>
Audience analysis	<u>0</u>

END OF EXERCISE

This exercise is designed to give you practice in completing FORM G.1(1) summarizing the learning analysis and competency analysis for each sub-STEP within a criterion behavior.

On page G-6 are the results of learning and competency analyses for four sub-STEPs which constitute a criterion behavior. Carry out the following procedures using the FORM G.1(1) appearing on page G-6a.

1. In the top half of FORM G.1(1), in the numbered column corresponding to the number of each sub-STEP, record an X if that sub-STEP has been identified on page G-6 as having learning problems rated hi or med.
2. In the bottom half of FORM G.1(1) record an X in each column identifying recall/transfer requirements for each sub-STEP.
3. After completing a column for each sub-STEP, compute the percentage of cells in a row having an X entry.

FOLD OUT THIS PAGE

Sub-STEP 2

[illegible]

Sub-STEP 4

[illegible]

LESSON

CRITERION OBJECTIVE

SUMMARY OF LEARNING AND PERFORMANCE PROBLEMS

LEARNING

Sub-Steps in a chain	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	FOR EACH ROW: % of H's/Total No. of Sub-Steps
Discriminations among INPUTS																					
Generalizations across INPUTS																					
Associations between INPUTS and ACTIONS																					
Generalizations across ACTIONS																					
Chaining a series of associations																					

PERFORMANCE

Sub-Steps in a chain	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	FOR EACH ROW: % of V's/Total No. of Sub-Steps
INPUT recall																					
INPUT transfer																					
ACTION recall																					
ACTION transfer																					

SEE ANSWERS

ANSWERS

LESSON

CRITERION OBJECTIVE

SUMMARY OF LEARNING AND PERFORMANCE PROBLEMS

LEARNING

Sub-Steps in a chain	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	FOR EACH ROW: % of H's/Total No. of Sub-Steps
Discriminations among INPUTS	X	X	X	X																	100%
Generalizations across INPUTS	X	X																			50%
Associations between INPUTS and ACTIONS		X	X	X																	75%
Generalizations across ACTIONS			X	X																	50%
Chaining a series of associations	X																				25%

PERFORMANCE

Sub-Steps in a chain	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	FOR EACH ROW: % of V's/Total No. of Sub-Steps
INPUT recall	X	X																			50%
INPUT transfer			X	X																	50%
ACTION recall		X		X																	50%
ACTION transfer	X		X																		50%

FOLD BACK PAGE G-5 END OF EXERCISE

This exercise is designed to give you practice using Section IA of FORM G.1(2) to: *Characterize Criterion Practice Requirements.*

Page G-10 contains three problems. Your task is to fill out Section IA on page G-10a for each problem.

Base your endorsements on the descriptions provided:

- Circle squares for those conditions which apply to the description
- Do nothing for those conditions which do not apply to the description.

**For practice purposes some descriptions are deliberately left incomplete.*

FOLD OUT THIS PAGE

Example #1: Diagnosing Engine Condition

- No simulation
- Use of vacuum hose, faulty engine, and specifications
- Performance in one direction
- Recall on a delayed basis is involved
- Production mode involved
- Learning problem is caused by length of the chain
- There is partial proficiency

Example #2: Identifying Foods

- Drawings of examples of food will be shown to children; they will be required to vocally name the food. Conversely, they will be given the name of a food and asked to point to it (selecting from those present). All examples will have been used in learning and delayed recall is required.
- Associating inputs and actions is difficult due to the large number of associations the children must retain.

Example #3: Animal Feeding Demonstration

- Actual rats are used
- No assistance is given in the demonstration
- Performance is in one direction and delayed basis is not a concern
- Student has to feed one rat a balanced diet and one an unbalanced diet for a week and contrast the appearance and behavior of the two rats
- During instruction student read about such demonstrations but did not carry one out
- Predominant training difficulty is discriminations because of the number of properties
- No partial proficiency

Example #1: Diagnosing Engine Condition

IA. Characterize Criterion Practice Requirements

PERFORMANCE	LEARNING PROBLEMS	PROBLEM SOURCE	MODE
☐ simulation ☐ aids available ☐ two directions ☒ transfer ☒ delayed basis ☐ recognition mode	INPUTS ☒ 3 discriminations ☒ 4 generalizations INPUTS & ACTIONS ☒ 5 associations ☒ 6 chains ACTIONS ☒ 7 generalizations ☐ partial proficiency	INPUTS ☒ A similarity (dis.) ☒ B No. of properties ☒ C No. of classes (or, No. members/class) INPUTS & ACTIONS ☒ D existing associations ☒ E length of chain ACTIONS ☒ F integrative strength	INPUTS ☒ I verbal/symbolic ☒ II environmental ☒ III audio ☒ IV non realistic ☒ V transient ACTIONS ☒ VI perceptual ☒ VII motor ☒ VIII vocal ☒ IX sub-vocal

Example #2: Identifying Foods

IA. Characterize Criterion Practice Requirements

PERFORMANCE	LEARNING PROBLEMS	PROBLEM SOURCE	MODE
☐ simulation ☐ aids available ☐ two directions ☒ transfer ☒ delayed basis ☐ recognition mode	INPUTS ☒ 3 discriminations ☒ 4 generalizations INPUTS & ACTIONS ☒ 5 associations ☒ 6 chains ACTIONS ☒ 7 generalizations ☐ partial proficiency	INPUTS ☒ A similarity (dis.) ☒ B No. of properties ☒ C No. of classes (or, No. members/class) INPUTS & ACTIONS ☒ D existing associations ☒ E length of chain ACTIONS ☒ F integrative strength	INPUTS ☒ I verbal/symbolic ☒ II environmental ☒ III audio ☒ IV non realistic ☒ V transient ACTIONS ☒ VI perceptual ☒ VII motor ☒ VIII vocal ☒ IX sub-vocal

Example #3: Animal Feeding Demonstration

IA. Characterize Criterion Practice Requirements

PERFORMANCE	LEARNING PROBLEMS	PROBLEM SOURCE	MODE
☐ simulation ☐ aids available ☐ two directions ☒ transfer ☒ delayed basis ☐ recognition mode	INPUTS ☒ 3 discriminations ☒ 4 generalizations INPUTS & ACTIONS ☒ 5 associations ☒ 6 chains ACTIONS ☒ 7 generalizations ☐ partial proficiency	INPUTS ☒ A similarity (dis.) ☒ B No. of properties ☒ C No. of classes (or, No. members/class) INPUTS & ACTIONS ☒ D existing associations ☒ E length of chain ACTIONS ☒ F integrative strength	INPUTS ☒ I verbal/symbolic ☒ II environmental ☒ III audio ☒ IV non realistic ☒ V transient ACTIONS ☒ VI perceptual ☒ VII motor ☒ VIII vocal ☒ IX sub-vocal

ANSWERS

Example #1: Diagnosing Engine Condition

IA. Characterize Criterion Practice Requirements

PERFORMANCE	LEARNING PROBLEMS	PROBLEM SOURCE	MODE
☐ simulation ☒ aids available ☐ two directions ☒ transfer ☒ delayed basis ☐ recognition mode	INPUTS ☒ 3 discriminations ☒ 4 generalizations INPUTS & ACTIONS ☒ 5 associations ☒ 6 chains ACTIONS ☒ 7 generalizations ☒ partial proficiency	INPUTS ☒ A similarity (dis.) ☒ B No. of properties ☒ C No. of classes (or, No. members/class) INPUTS & ACTIONS ☒ D existing associations ☒ E length of chain ACTIONS ☒ F integrative strength	INPUTS OUTPUTS ☒ I verbal/symbolic ☒ I ☒ II environmental ☒ II ☒ III audio ☒ III ☒ IV non-realistic ☒ IV ☒ V transient ☒ V ACTIONS ☒ VI perceptual ☒ VIII vocal ☒ VII motor ☒ IX sub-vocal

Example #2: Identifying Foods

IA. Characterize Criterion Practice Requirements

PERFORMANCE	LEARNING PROBLEMS	PROBLEM SOURCE	MODE
☒ simulation ☒ aids available ☒ two directions ☒ transfer ☒ delayed basis ☒ recognition mode	INPUTS ☒ 3 discriminations ☒ 4 generalizations INPUTS & ACTIONS ☒ 5 associations ☒ 6 chains ACTIONS ☒ 7 generalizations ☐ partial proficiency	INPUTS ☒ A similarity (dis.) ☒ B No. of properties ☒ C No. of classes (or, No. members/class) INPUTS & ACTIONS ☒ D existing associations ☒ E length of chain ACTIONS ☒ F integrative strength	INPUTS OUTPUTS ☒ I verbal/symbolic ☒ I ☒ II environmental ☒ II ☒ III audio ☒ III ☒ IV non-realistic ☒ IV ☒ V transient ☒ V ACTIONS ☒ VI perceptual ☒ VIII vocal ☒ VII motor ☒ IX sub-vocal

Example #3: Animal Feeding Demonstration

IA. Characterize Criterion Practice Requirements

PERFORMANCE	LEARNING PROBLEMS	PROBLEM SOURCE	MODE
☐ simulation ☐ aids available ☐ two directions ☒ transfer ☒ delayed basis ☐ recognition mode	INPUTS ☒ 3 discriminations ☒ 4 generalizations INPUTS & ACTIONS ☒ 5 associations ☒ 6 chains ACTIONS ☒ 7 generalizations ☐ partial proficiency	INPUTS ☒ A similarity (dis.) ☒ B No. of properties ☒ C No. of classes (or, No. members/class) INPUTS & ACTIONS ☒ D existing associations ☒ E length of chain ACTIONS ☒ F integrative strength	INPUTS OUTPUTS ☒ I verbal/symbolic ☒ I ☒ II environmental ☒ II ☒ III audio ☒ III ☒ IV non-realistic ☒ IV ☒ V transient ☒ V ACTIONS ☒ VI perceptual ☒ VIII vocal ☒ VII motor ☒ IX sub-vocal

After reading
Handbook for
sub-STEP(S)

G.1.4

DO
EXERCISE

4

This exercise is intended to give you practice in designing criterion practice and recording it in Section 1B of FORM G.1(2).

FOLD OUT THIS PAGE

G-12/ G-13

EXERCISE 4

Review the three types of information provided on this and the next page:
(1) Section 1A of FORM G.1(2), (2) a statement of objectives, and (3) test item.

Then, fill out Section 1B of FORM G.1(2) at the bottom of page G-14a.

Form G.1(2)

LESSON 		SPECIFICATION OF OBJECTIVES
GIVEN Criterion Inputs • model (visual-verbal) • number of examples from class • new and/or old examples • representative conditions • availability of performance aids	STUDENT WILL Criterion Actions • model (reception, editing, production) • generate new and/or old examples • model (perceptual, motor, vocal, out)	RESULTING IN Criterion Outputs • model (visual-verbal) • rules, standards • quantitative amount (degree, time, etc.) • qualitative
Quantitative and qualitative resulting from observation of demonstration (new)	Formulate a question about the data and a hypothesis to answer it	A question about relationships among events and a hypothesis to account for the relationship

Form G.1(2)

LESSON OBJECTIVE FORM FOR TEST DEVELOPMENT

"GIVEN"	INFORMATION YOU PLAN TO GIVE TO STUDENT
• Introduction • Question or Problem • Stimulus (new/old) • Action (new/old) • Answer or Response (new/old)	A four-inch candle is lighted and allowed to burn for one minute. Then a two-liter bell jar is placed over the candle. The flame grows gradually weaker and shorter until after two minutes, fourteen seconds, the flame is completely out.

"STUDENT WILL"	WHAT THE STUDENT IS EXPECTED TO DO
• Actions (new/old) • Response	Write a question that is suggested by the data, and write a hypothesis to answer the question.

"RESULTING IN"	WHAT THE STUDENT IS EXPECTED TO TURN OUT
• Output • Response • Time in Learning • Standards • Response	(Sample answer) What caused the flame to get shorter and then go out? The hypothesis is that there was a lack of something needed for continued burning that caused the flame to die out.

1A. Characterize Criterion Practice Requirements

PERFORMANCE	LEARNING PROBLEMS	PROBLEM SOURCE	MODE
☐ simulation	☒ 3 INPUTS discriminations	☒ A INPUTS similarity (dis.)	☒ I INPUTS verbal/symbolic ☒ I OUTPUTS
☐ aids available	☐ 4 generalizations	☐ B No. of properties	☐ II environmental ☐ II
☐ two directions	INPUTS & ACTIONS	☐ C No. of classes (or, No. members/class)	☐ III audio ☐ III
☒ 1 transfer	☐ 5 associations	INPUTS & ACTIONS	☐ IV non realistic ☐ IV
☐ 2 delayed basis	☐ 6 chains	☐ D existing associations	☐ V transient ☐ V
☐ recognition mode	ACTIONS	☐ E length of chain	ACTIONS
	☐ 7 generalizations	ACTIONS	☐ VI perceptual ☐ VIII vocal
	☐ partial proficiency	☐ F integrative strength	☒ VII motor ☒ IX sub-vocal

PLAN INSTRUCTIONAL STRATEGIES

1B. Design Criterion Practice

	GIVEN as	INPUT	STUDENT WILL take ACTION	RESULTING IN	OUTPUT
EXAMPLE(S) properties of additional examples					

SEE ANSWERS

ANSWERS

IA. Characterize Criterion Practice Requirements

PERFORMANCE	LEARNING PROBLEMS	PROBLEM SOURCE	MODE
☐ simulation ☐ aids available ☐ two directions ☒ transfer ☒ delayed basis ☐ recognition mode	☒ 3 INPUTS discriminations generalizations ☒ 4 ☐ 5 INPUTS & ACTIONS associations ☐ 6 chains ☐ 7 ACTIONS generalizations ☐ partial proficiency	☒ A INPUTS similarity (dis.) ☐ B No. of properties ☐ C No. of classes (or. No. members/class) ☐ D INPUTS & ACTIONS existing associations ☐ E length of chain ☐ F ACTIONS integrative strength	☒ I INPUTS verbal/symbolic ☐ II environmental ☐ III audio ☐ IV non realistic ☐ V transient ☐ VI ACTIONS perceptual ☒ VII motor ☐ VIII vocal ☒ IX sub-vocal

IB. Design Criterion Practice

	GIVEN as INPUT	STUDENT WILL take ACTION	RESULTING IN OUTPUT
EXAMPLE (S) properties of additional examples	Observational data and instructions to formulate a question about them and a hypothesis about its answer	(1) Write a question about the observation (2) Write a hypothesis to answer the question	A question and hypothesis relevant to the data

FOLD BACK PAGE G-13

END OF EXERCISE

After reading
Handbook for
sub-STEP(S)

G.2.1

DO
EXERCISE

5

Exercises 5A-5N were designed to give you practice in identifying and developing preparatory practice progressions.

TURN TO NEXT PAGE FOR PROBLEMS

EXERCISE 5A: SHAPING

In the final stage of practice a Little League baseball pitcher is described below.

Your task is to design the first and intermediate stages of practice.

Design three types of "shaping" progressions: (1) variations in unit size, (2) variations in quality, and (3) variations in duration.

	First Stage	Intermediate Stage	Final Stage
UNIT SIZE			Pitches a fast ball, change-up, and a curve with accuracy (He puts the ball where he wants it). Pitches for six innings.
QUALITY			
DURATION			

SEE ANSWERS

ANSWERS

EXERCISE 5A: SHAPING

In the final stage of practice a Little League baseball pitcher is described below.

Your task is to design the first and intermediate stages of practice.

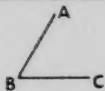
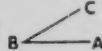
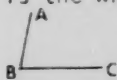
Design three types of "shaping" progressions: (1) variations in unit size, (2) variations in quality, and (3) variations in duration.

	First Stage	Intermediate Stage	Final Stage
UNIT SIZE	Practices only the wind-up.	Remaining portions of a pitch are gradually added.	Pitches a fast ball, change-up, and a curve with accuracy (He puts the ball where he wants it). Pitches for six innings.
QUALITY	Strike zone is made wider and taller (to begin with).	Gradually more accuracy is required. The strike zone is incrementally narrowed toward standard size.	
DURATION	Pitches one inning.	Over time in different games practices pitching for 2, 3, 4, and 5 innings.	

DO NEXT PROBLEM

EXERCISE 5B: REP

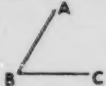
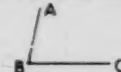
For each problem below put an X in the column indicating the type of practice required.

	Practice Items	Recognition	Edit	Produce
1.	Describe this angle. 			
2.	I would describe this angle like this: $\angle XYZ$. Describe this angle:  			
3.	How would you describe this angle?  $\angle ABC$ $\angle BAC$ $\angle CAB$			
4.	$\angle BAC$ is the wrong description of this angle. Change it. 			
5.	The middle letter describes the vertex of an angle. $\angle ABC$ describes which angle?  			
6.	Describe an angle with the vertex B and points A and C.			

ANSWERS

EXERCISE 5B: REP

For each problem below put an X in the column indicating the type of practice required.

	Practice Items	Recognition	Edit	Produce
1.	Describe this angle. 			X
2.	I would describe this angle like this: $\angle XYZ$. Describe this angle:  			X
3.	How would you describe this angle?  $\angle ABC$ $\angle BAC$ $\angle CAB$	X		
4.	$\angle BAC$ is the wrong description of this angle. Change it. 		X	
5.	The middle letter describes the vertex of an angle. $\angle ABC$ describes which angle?  	X		
6.	Describe an angle with the vertex B and points A and C.			X

EXERCISE 5C: MODE (REP)

For each of the following criterion behaviors, design two types of practice: editing and production.

	INPUT	ACTION	OUTPUT	Common Errors	Editing Practice	Production Practice
1.	Electronic equipment	Check out equipment	Diagnosis	Takes safety precautions in wrong sequence (too late)		
2.	Well behaved child	Reward good behavior	Child rewarded	Teacher ignores good behavior instead of rewarding it		
3.	Compound sentence	Place comma before conjunction	Sentence correctly punctuated	Places comma after the conjunction		
4.	Battery	Check level and fill	Filled to specific level	Adds too much water		
5.	Decimal to be rounded off	Rounds off	Correct decimal to one place	Follows no rule about numbers larger and smaller than 5		

SEE ANSWERS

ANSWERS

EXERCISE 5C: MODE (REP)

editing and production.

For each of the following criterion behaviors, design two types of practice: editing and production.

Common Errors

Editing Practice

Production Practice

INPUT	ACTION	OUTPUT
1. Elec- tronic equip- ment	Check out equip- ment	Diagnosis
2. Well behaved child	Reward good behavior	Child rewarded
3. Compound sentence	Place comma before conjunc- tion	Sentence correct- ly punc- tuated
4. Battery	Check level and fill	Filled to specific level
5. Decimal to be rounded off	Rounds off	Correct decimal to one place

Takes safety precau-
tions in wrong
sequence (too late)

Teacher ignores good
behavior instead of
rewarding it

Places comma after
the conjunction

Adds too much water

Follows no rule about
numbers larger and
smaller than 5

Watch this procedure
and then indicate what
you would do differ-
ently.

This teacher did wrong;
what should she have
done?

Look at the punctua-
tion of this compound
sentence. How would
you punctuate it?

The cells in this
battery have been
incorrectly filled.
Fill this one correct-
ly.

7.24 was rounded off
to 7.3. What should
it have been?

Check out this
equipment.

How would you handle
this child?

Punctuate this
compound sentence.

Fill the cells of
this battery.

Round off this number
to the nearest
decimal: 19.65.

DO NEXT PROBLEM

EXERCISE 5D: MODE (REP)

For each of the tasks below create three different types of practice items, each in a different mode.

		COMMON ERRORS					
		SUBJECT	TASK		#1	#2	#3
1.	Arithmetic	Long division	Stops too soon (ignores remainder)				
2.	English	Punctuation	Incorrectly uses colon and semicolon				
3.	Auto mechanics	Adjust distributor to improve timing	Step in wrong sequence				
4.	Geography	Sequence photos showing land change	Wrong sequence of events				
5.	Literature	Identify genre of a poem	Confuses narrative and epic poems				

SEE ANSWERS

ANSWERS

EXERCISE 5D: MODE (REP)

For each of the tasks below create three different types of practice items, each in a different mode.

COMMON ERRORS

SUBJECT	TASK	COMMON ERRORS	#1	#2	#3
1. Arithmetic	Long division	Stops too soon (ignores remainder)	In which of these two problems has the long division been done correctly?	Correct the long division for this problem.	Find the quotient for this problem.
2. English	Punctuation	Incorrectly uses colon and semi-colon	Which of these two sentences is correctly punctuated?	What is wrong with this punctuation? How would you do it?	Punctuate this sentence.
3. Auto mechanics	Adjust distributor to improve timing	Step in wrong sequence	Which of these is the correct sequence to follow?	Did I adjust the distributor properly? If not, what should I have done?	Adjust the timing on this engine.
4. Geography	Sequence photos showing land change	Wrong sequence of events	Which sequence is in the right order?	This sequence is incorrect. How should they be sequenced?	Put these pictures in the proper sequence.
5. Literature	Identify genre of a poem	Confuses narrative and epic poems	Which of these two poems is correctly classified as an epic poem?	This poem has been incorrectly labeled as an "epic poem." What should it be?	What is the genre of this poem?

DO NEXT PROBLEM

EXERCISE 5E: MODE (VISUAL/VERBAL, CONCRETE/ABSTRACT, PROCEDURE/VERBAL)

For each of the following objectives below, two types of practice have been devised.

Indicate by writing the number 1 or 2 next to each example the order in which you would have the learner practice them.

Concept or Principle

Practice A

Practice B

1.	Closer the fulcrum is to the load, the less force is required to lift the load.	Place the fulcrum where it will let you use less force to lift this ten pound load.	Which way should I move the fulcrum on a lever to make lifting the load easier? Why?
2.	When stress is removed from perfectly elastic objects, they return to their original shape.	What happens to a perfectly elastic object when the stress is removed?	If I remove the stress, will this spring look like this or like this?
3.	The larger the area over which the same force is applied, the <u>less</u> pressure there is.	Place this block on this sheet of paper in such a way that the paper will not tear.	How does the area of an object relate to the amount of pressure it applies?
4.	Extinction means ignoring (neither rewarding nor punishing) behavior.	Define extinction and give an example.	Which of these case study management behaviors represents an example of extinction?
5.	Weight of water displaced by submerged object is equal to the apparent loss of weight when the object is submerged.	When you sit down in a bathtub, the water level rises. How do you account for this phenomenon?	Will the overflow in this tank weigh one pound, less than a pound, or more than a pound when I submerge this one pound object?

SEE ANSWERS

ANSWERS

EXERCISE 5E: MODE (VISUAL/VERBAL, CONCRETE/ABSTRACT, PROCEDURE/VERBAL)

For each of the following objectives below, two types of practice have been devised. Indicate by writing the number 1 or 2 next to each example the order in which you would have the learner practice them.

Concept or Principle

1. Closer the fulcrum is to the load, the less force is required to lift the load.

2. When stress is removed from perfectly elastic objects, they return to their original shape.

3. The larger the area over which the same force is applied, the less pressure there is.

4. Extinction means ignoring (neither rewarding nor punishing) behavior.

5. Weight of water displaced by submerged object is equal to the apparent loss of weight when the object is submerged.

Practice A

Place the fulcrum where it will let you use less force to lift this ten pound load.

What happens to a perfectly elastic object when the stress is removed?

Place this block on this sheet of paper in such a way that the paper will not tear.

Define extinction and give an example.

When you sit down in a bathtub, the water level rises. How do you account for this phenomenon?

Practice B

Which way should I move the fulcrum on a lever to make lifting the load easier? Why?

If I remove the stress, will this spring look like this or like this?

How does the area of an object relate to the amount of pressure it applies?

Which of these case study management behaviors represents an example of extinction?

Will the overflow in this tank weigh one pound, less than a pound, or more than a pound when I submerge this one pound object?

EXERCISE 5F: MODE (VISUAL/VERBAL, CONCRETE/ABSTRACT)

For each of the following learning tasks, design an example of initial practice you would use to make learning easier.

Base your example on either of these progressions: (a) visual/verbal; (b) concrete/abstract.

Concepts or Principles	Initial Practice
1. Reinforcing (rewarding) a behavior when it occurs increases the likelihood the behavior will occur again.	
2. Secession is defined as the formal withdrawal from an organization (as a religious communion, or political party, or federation).	
3. Balance is the stability produced by an even distribution of weight on each side of a vertical axis.	
4. Fiscal policies relate to management of taxation, public revenues, or public debt.	
5. Carnivorous animals have teeth structurally adapted for killing and tearing meat.	

SEE ANSWERS

ANSWERS

EXERCISE 5F: MODE (VISUAL/VERBAL, CONCRETE/ABSTRACT)

For each of the following learning tasks, design an example of initial practice you would use to make learning easier.

Base your example on either of these progressions: (a) visual/verbal; (b) concrete/abstract.

	Concepts or Principles	Initial Practice
1.	Reinforcing (rewarding) a behavior when it occurs increases the likelihood the behavior will occur again.	<i>What should I do if I want a child who has displayed courtesy to continue being courteous.</i>
2.	Secession is defined as the formal withdrawal from an organization (as a religious communion, or political party, or federation).	<i>The Civil War broke out when South Carolina withdrew from the United States. What is this type of withdrawal called?</i>
3.	Balance is the stability produced by an even distribution of weight on each side of a vertical axis.	<i>Which of these two sets of scales is balanced?</i>
4.	Fiscal policies relate to management of taxation, public revenues, or public debt.	<i>Which is an example of fiscal policy? -School bond issue or an interest charge on a personal loan</i>
5.	Carnivorous animals have teeth structurally adapted for killing and tearing meat.	<i>Look at the teeth of these animals. Which is carnivorous?</i>

DO NEXT PROBLEM

EXERCISE 5G: CUES

In the problems below identify the type of cues which have been used.

Put an X in the appropriate column.

	Criterion Performance	Cue Used in Instruction	Example or Demonstration	Verbal Cues	Visual Cues
1.	Insert a valve in equipment.	Enlarged view of valve showing correct position.			
2.	What season would it be in Bogota during January?	In cities north of the equator during January it snows. Bogota is <u>south</u> of the equator.			
3.	Given an example of two homophones.	Homophones are words which are pronounced the same but are spelled differently.			
4.	States that air moves over the top of an airfoil faster than past the bottom.	Arrow superimposed on TV image shows points at under and upper side of wing.			
5.	Classify all plant types belonging to the same family.	Series of pictures belonging to same family enclosed in a square.			
6.	Describe what the "laissez faire" philosophy suggests.	"Laissez faire," meaning "to leave alone," describes government's relationship to business.			
7.	Read three lines of text in a reader.	Pictorial representation of the action in the "story" above the text.			
8.	Reading a list of words aloud with the "an" sound.	TanK PanT SanD			
9.	Make a transparency for an overhead projector on a thermofax machine.	Place the film on your original copy so that it looks like this sample.			
10.	Using reinforcement to manage classroom behavior.	Film showing when and how to use reinforcement.			

ANSWERS

EXERCISE 5G: CUES

In the problems below identify the type of cues which have been used.

Put an X in the appropriate column.

	Criterion Performance	Cue Used in Instruction	Example or Demonstration	Verbal Cues	Visual Cues
1.	Insert a valve in equipment.	Enlarged view of valve showing correct position.	X		
2.	What season would it be in Bogota during January?	In cities north of the equator during January it snows. Bogota is south of the equator.		X	
3.	Given an example of two homophones.	Homophones are words which are pronounced the same but are spelled differently.		X	
4.	States that air moves over the top of an airfoil faster than past the bottom.	Arrow superimposed on TV image shows points at under and upper side of wing.			X
5.	Classify all plant types belonging to the same family.	Series of pictures belonging to same family enclosed in a square.			X
6.	Describe what the "laissez faire" philosophy suggests.	"Laissez faire," meaning "to leave alone," describes government's relationship to business.		X	
7.	Read three lines of text in a reader.	Pictorial representation of the action in the "story" above the text.			X
8.	Reading a list of words aloud with the "an" sound.	TanK PanT SanD			X
9.	Make a transparency for an overhead projector on a thermofax machine.	Place the film on your original copy so that it looks like this sample.	X		
10.	Using reinforcement to manage classroom behavior.	Film showing when and how to use reinforcement.	X		

EXERCISE 5H: CUES

For each of the following examples produce a demonstration, model, or example which is designed to assist the learner to practice criterion performance.

	Criterion Performance	Demonstration or Example
1.	A man must take all the steps involved in removing and replacing a faulty automotive ignition coil.	
2.	Student actor has to act in a restoration play and perform in a stylized way appropriate to play.	
3.	A biology student must put a slide on a microscope and adjust the view.	
4.	Student has to write paragraph which meets formal property requirements (e.g., organization, length, etc.)	
5.	A student lifeguard must learn to jump into the water and get to the victim in the quickest possible way.	

SEE ANSWERS

ANSWERS

EXERCISE 5H: CUES

For each of the following examples produce a demonstration, model, or example which is designed to assist the learner to practice criterion performance.

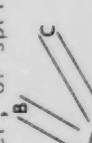
Criterion Performance	Demonstration or Example
1. A man must take all the steps involved in removing and replacing a faulty automotive ignition coil.	<i>Demonstration of all the steps involved in removing and replacing a faulty automotive ignition coil.</i>
2. Student actor has to act in a restoration play and perform in a stylized way appropriate to play.	<i>The director demonstrates how to do a scene.</i>
3. A biology student must put a slide on a microscope and adjust the view.	<i>Show the student how to place slide on microscope and make adjustment.</i>
4. Student has to write paragraph which meets formal property requirements (e.g., organization, length, etc.).	<i>Provide model paragraph.</i>
5. A student lifeguard must learn to jump into the water and get to the victim in the quickest possible way.	<i>Demonstrate correct life saving leap into water.</i>

DO NEXT PROBLEM

EXERCISE 51: CUES

A practice problem has been designed for each criterion performance below.

Prepare a verbal cue you might add to the problem which would assist or prompt the learner to make the correct response.

Criterion Performance	Practice Item	Verbal Cue
1. Drop a vowel when adding "ing" to a word ending with silent "e."	Rewrite the following words adding "ing" at the end of them. PRECEDE CURVE POSE BONE	
2. Identify the season of the year from a given diagram showing slant of the sun's rays and the time of day. a = summer b = spring and fall c = winter	Imagine this is Washington, D.C., at 12:00. Label the three sun's rays as summer, fall, winter, or spring. 	
3. Recall the names of the seven dwarfs in the story "Snow White."	Name the seven dwarfs in "Snow White."	
4. Given a physics problem, select the correct formula, substitute values in formula, and solve problem.	What is the power being produced if voltage is 120 and current is 60 watts?	
5. Translate written French into written English.	Translate this paragraph of French into English.	

SEE ANSWERS

ANSWERS

EXERCISE 51: CUES

A practice problem has been designed for each criterion performance below.

Prepare a verbal cue you might add to the problem which would assist or prompt the learner to make the correct response.

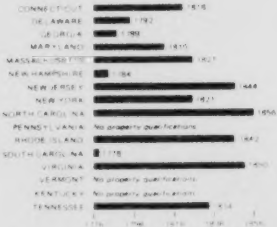
Criterion Performance	Practice Item	Verbal Cue
1. Drop a vowel when adding "ing" to a word ending with silent "e."	Rewrite the following words adding "ing" at the end of them. PRECEDE CURVE POSE BONE	Give an example: When ING is added to MAKE, it is spelled MAKING. OR State the rule: When adding ING to a word ending in a silent E, drop the E.
2. Identify the season of the year from a given diagram showing slant of the sun's rays and the time of day. a = summer b = spring and fall c = winter	Imagine this is Washington, D.C., at 12:00. Label the three sun's rays as summer, fall, winter, or spring. 	State the rule: The more oblique the rays, the colder the temperature. OR The weather is warmest when the sun is directly overhead.
3. Recall the names of the seven dwarfs in the story "Snow White."	Name the seven dwarfs in "Snow White."	Call attention to characteristics of dwarfs, e.g.: The dwarf who was always smiling is called _____. The one who couldn't stay awake is called _____. Etc.
4. Given a physics problem, select the correct formula, substitute values in formula, and solve problem.	What is the power being produced if voltage is 120 and current is 60 watts?	The formula for "power" is: $P = V \times I$
5. Translate written French into written English.	Translate this paragraph of French into English.	Provide the meaning of several new, infrequently used words.

DO NEXT PROBLEM

EXERCISE 5J: CUES

Below are examples of visual cues that were designed to assist the student to learn abstract, verbal concepts and principles.

Put an X through the relevant property(ies) of the cue that the learner can readily respond to, thereby making it easier for him to learn the more abstract, verbal materials.

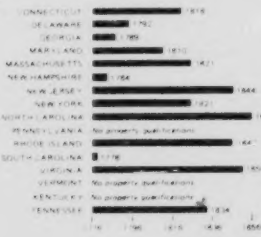
1.	<u>Principle:</u> Relationship between heat and molecular movement <u>Visual cue:</u> Animated film showing faster vibrations of molecules in steel bar following application of flame	Relative speed of moving objects	Relationship between cause (before) and effect (after)	Amount of heat (color of flame) and speed of movement
2.	<u>Fact:</u> Proportion of federal, state, and local funds required for urban renewal projects <u>Visual cue:</u> 	Relative area sizes	Number of markings in areas	Differences in shading
3.	<u>Concept:</u> Vertebrate and non-vertebrate animals <u>Visual cue:</u> The names of animals that are vertebrates are enclosed in one square labeled "vertebrates"; non-vertebrates are enclosed in another labeled "non-vertebrates"	Separateness of boxes	Grouping	Size of boxes
4.	<u>Fact:</u> How early particular states abolished property qualifications for voting <u>Visual cue:</u> 	Number of lines	Relative lengths of lines on chart	Differentiated (separate) lines
5.	<u>Principle:</u> Like electrical charges repel each other <u>Visual cue:</u> Live demonstration showing positively charged objects (marked with +) cause positively charged balls to move apart	Duration of movement	Similarity of charges	Speed of movement

ANSWERS

EXERCISE 5J: CUES

Below are examples of visual cues that were designed to assist the student to learn abstract, verbal concepts and principles.

Put an X through the relevant property(ies) of the cue that the learner can readily respond to, thereby making it easier for him to learn the more abstract, verbal materials.

1.	<u>Principle:</u> Relationship between heat and molecular movement <u>Visual cue:</u> Animated film showing faster vibrations of molecules in steel bar following application of flame	Relative speed of moving objects	Relationship between cause (before) and effect (after)	Amount of heat (color of flame) and speed of movement
2.	<u>Fact:</u> Proportion of federal, state, and local funds required for urban renewal projects <u>Visual cue:</u> 	Relative area sizes	Number of markings in areas	Differences in shading areas
3.	<u>Concept:</u> Vertebrate and non-vertebrate animals <u>Visual cue:</u> The names of animals that are vertebrates are enclosed in one square labeled "vertebrates"; non-vertebrates are enclosed in another labeled "non-vertebrates"	Separateness of boxes	Grouping	Size of boxes
4.	<u>Fact:</u> How early particular states abolished property qualifications for voting <u>Visual cue:</u> 	Number of lines	Relative lengths of lines on chart	Differentiated (separate) lines
5.	<u>Principle:</u> Like electrical charges repel each other <u>Visual cue:</u> Live demonstration showing positively charged objects (marked with +) cause positively charged balls to move apart	Duration of movement	Similarity of charges	Speed of movement

EXERCISE 5K: CONTENT

Below are examples of the first stage in content progressions. In the last column, with an X, identify the type of content progression which was used:

- j. Principles about procedures/procedures
- k. Altered criterion behavior/criterion behavior
- l. Practice of errors/criterion behavior
- m. Editing/criterion behavior
- n. Backward chaining

	Criterion Behavior	1st Sequence of Practice	Progression Type
1.	Expands a binomial	States rules about procedures, e.g., reducing exponents by one, etc.	
2.	Develop a practice progression involving mode variations: recognize, edit, produce	Given a variety of practice situations which do not correctly implement the REP mode, the student verbally states what should have been done	
3.	Complete a forward pass (high schooler)	Watches video tape of his own performance and compares with performance of professional	
4.	Tying a shoe lace	Pulls the nearly completed bow tight	
5.	Casting with a fishing rod (releasing the thumb at the right moment in the swing)	Practices releasing his thumb too early and too late	
6.	Given a painting, the student will identify when it was painted, e.g., during the Renaissance or during the Middle Ages	The student is started by contrasting contemporary abstract expressionist paintings with realistic painting from the 18th century	
7.	Write the Russian alphabet	Writes letters of the alphabet and compares with a standard, correcting when wrong	
8.	Develop training materials, try out the materials, and revise them on basis of tryout data	Revises materials, tries out materials, and then develops materials	
9.	Given a distribution, the student will determine the appropriate average to use (i.e., mean, median, mode) and compute the average selected	Student verbally identifies the conditions which call for each type of average	
10.	Identify oriental rug on the basis of number of borders, colors, and patterns	Student is given black and white drawings so that patterns <u>only</u> can be compared	

ANSWERS

EXERCISE 5K: CONTENT

Below are examples of the first stage in content progressions. In the last column, with an X, identify the type of content progression which was used:

- j. Principles about procedures/procedures
- k. Altered criterion behavior/criterion behavior
- l. Practice of errors/criterion behavior
- m. Editing/criterion behavior
- n. Backward chaining

	Criterion Behavior	1st Sequence of Practice	Progression Type
1.	Expands a binomial	States rules about procedures, e.g., reducing exponents by one, etc.	j
2.	Develop a practice progression involving mode variations: recognize, edit, produce	Given a variety of practice situations which do not correctly implement the REP mode, the student verbally states what should have been done	m
3.	Complete a forward pass (high schooler)	Watches video tape of his own performance and compares with performance of professional	m
4.	Tying a shoe lace	Pulls the nearly completed bow tight	n
5.	Casting with a fishing rod (releasing the thumb at the right moment in the swing)	Practices releasing his thumb too early and too late	l
6.	Given a painting, the student will identify when it was painted, e.g., during the Renaissance or during the Middle Ages	The student is started by contrasting contemporary abstract expressionist paintings with realistic painting from the 18th century	k
7.	Write the Russian alphabet	Writes letters of the alphabet and compares with a standard, correcting when wrong	m
8.	Develop training materials, try out the materials, and revise them on basis of tryout data	Revises materials, tries out materials, and then develops materials	n
9.	Given a distribution, the student will determine the appropriate average to use (i.e., mean, median, mode) and compute the average selected	Student verbally identifies the conditions which call for each type of average	j
10.	Identify oriental rug on the basis of number of borders, colors, and patterns	Student is given black and white drawings so that patterns <u>only</u> can be compared	k

EXERCISE 5L: CONTENT

For each criterion behavior below select a CONTENT progression suitable for it.

Then, design an appropriate practice item. The practice problem should be one you would use in the first or early stages of a progression.

	Criterion Behavior	Develop First Sequence of Practice Here:
1.	Designing graphics for TV, taking into account the fact that the viewer at home will see less of the image (anything on the edges is lost in transmission) than seen in the TV studio	
2.	Using the correct procedure to add egg yolks to a hot liquid so that the eggs are not scrambled (cooked) by the hot liquid	
3.	Correct pronunciation of Russian	
4.	Produce a design using the following technique: (1) with water-soluble paint draw design on a board; (2) cover entire board with non-soluble ink; (3) run water over board to remove paint, leaving ink to delineate design	
5.	Student must distinguish between various kinds of cats	

SEE ANSWERS

ANSWERS

EXERCISE 5L: CONTENT

For each criterion behavior below select a CONTENT progression suitable for it.

Then, design an appropriate practice item. The practice problem should be one you would use in the first or early stages of a progression.

	Criterion Behavior	Develop First Sequence of Practice Here:
1.	Designing graphics for TV, taking into account the fact that the viewer at home will see less of the image (anything on the edges is lost in transmission) than seen in the TV studio	<i>Student learns rule about designing graphics in the center of a TV board so that loss during transmission will not affect design</i> <i>Principles about procedure/procedure</i>
2.	Using the correct procedure to add egg yolks to a hot liquid so that the eggs are not scrambled (cooked) by the hot liquid	<i>Student incorrectly adds yolks to hot liquids to see the results of his incorrect action</i> <i>Practice of errors/criterion behavior</i>
3.	Correct pronunciation of Russian	<i>Student records his own performance on tape, then listens to tape in order to critique performance</i> <i>Editing/criterion behavior</i>
4.	Produce a design using the following technique: (1) with water-soluble paint draw design on a board; (2) cover entire board with non-soluble ink; (3) run water over board to remove paint, leaving ink to delineate design	<i>Have the student practice the last step first</i> <i>Backward chaining</i>
5.	Student must distinguish between various kinds of cats	<i>Have student distinguish between pair of cats which are grossly different</i> <i>Altered criterion behavior/criterion behavior</i>

DO NEXT PROBLEM

EXERCISE 5M: FREQUENCY/VARIATION

For each of the criterion behaviors described below put an X in a column to indicate which one type of practice progression would be most appropriate to insure learning.

	Criterion Behaviors	Repetition	Review	Varied Examples
1.	Associating initial consonants with a sound			
2.	Identifying the style of a painting, no matter what the subject matter			
3.	Pitching a ball within the strike zone			
4.	Medic must be ready to handle rare emergency situations			
5.	Identifying a research method used in a study as being one of nine basic types			
6.	Reading music and playing the piano			
7.	Stating the steps in the processing of canned peas			
8.	Classifying food into four food group classifications, i.e., milk group, meat group, fruit and vegetable group, and breads and cheeses			
9.	Selecting techniques appropriate to a new accounting assignment			
10.	Having to remember a large number of legal precedents and decisions			

ANSWERS

EXERCISE 5M: FREQUENCY/VARIATION

For each of the criterion behaviors described below put an X in a column to indicate which one type of practice progression would be most appropriate to insure learning.

	Criterion Behaviors	Repetition	Review	Varied Examples
1.	Associating initial consonants with a sound	X		
2.	Identifying the style of a painting, no matter what the subject matter			X
3.	Pitching a ball within the strike zone	X		
4.	Medic must be ready to handle rare emergency situations		X	
5.	Identifying a research method used in a study as being one of nine basic types			X
6.	Reading music and playing the piano	X		
7.	Stating the steps in the processing of canned peas		X	
8.	Classifying food into four food group classifications, i.e., milk group, meat group, fruit and vegetable group, and breads and cheeses			X
9.	Selecting techniques appropriate to a new accounting assignment			X
10.	Having to remember a large number of legal precedents and decisions		X	

EXERCISE 5N: FREQUENCY/VARIATION

1. Put an X through the situation which is the most appropriate candidate for using repetition as a practice progression.

a.	b.	c.
Compare and contrast the types of food and their use on earth and on a space flight.	Listen to this chord on the piano. Identify the precise size of the interval.	Remembering a cooking recipe (someone who uses widely and frequently varied menus

2. Put an X through the situation which is the most appropriate candidate for using review as a practice progression.

a.	b.	c.
Given an engineering problem to solve, selecting the right formula.	Compute chi square using this formula: $\chi^2 = \frac{(A+B)(C+D)(A+C)(B+D)}{(A+B+C+D)^2}$	Producing the products of all possible combinations of the numbers 1-10.

3. Put an X through the situation which is the most appropriate candidate for using varied examples.

a.	b.	c.
Remembering the atomic weights of each element in the periodic table.	Setting up a slide on a microscope and adjusting the focus.	Given an example of a specific voice range, identifying it as soprano, alto, tenor, or bass.

SEE ANSWERS

ANSWERS

EXERCISE 5N: FREQUENCY/VARIATION

1. Put an X through the situation which is the most appropriate candidate for using repetition as a practice progression.

a.	b.	c.
Compare and contrast the types of food and their use on earth and on a space flight.	~~Listen to this chord on the piano. Identify the precise size of the interval.~~	Remembering a cooking recipe (someone who uses widely and frequently varied menus).

2. Put an X through the situation which is the most appropriate candidate for using review as a practice progression.

a.	b.	c.
Given an engineering problem to solve, select the right formula.	~~Compute chi square using this formula: $\chi^2 = \frac{(A+B)(C+D)(A+C)(B+D)}{n^2}$~~	Producing the products of all possible combinations of the numbers 1-10.

3. Put an X through the situation which is the most appropriate candidate for using varied examples.

a.	b.	c.
Remembering the atomic weights of each element in the periodic table.	Setting up a slide on a microscope and adjusting the focus.	~~Given an example of a specific voice range, identifying it as soprano, alto, tenor, or bass.~~

END OF EXERCISE

Exercises 6A-6G have been designed to give you practice in developing actual practice progressions for selected types of learning problems.

In each exercise that follows you will be given three filled-in sections of FORM G.1(2):

- IA Characterization of Criterion Practice Requirements
- IB Design of Criterion Practice
- IIB Selection of Preparatory Practice Progressions

Your task will be to fill in all three rows in the following section of FORM G.1(2):

- IIB Design Preparatory Practice Progressions

TURN TO NEXT PAGE FOR PROBLEMS

EXERCISE 6A

This exercise is designed to give you practice developing or designing a preparatory practice progression for:

Problem: (3) X (A) - Discriminating Between Similar INPUTS

FOLD OUT THIS PAGE

G-48 / G-49

IA. Characterize Criterion Practice Requirements

PERFORMANCE	LEARNING PROBLEMS	PROBLEM SOURCE	MODE
☐ simulation ☐ aids available ☐ two directions ☒ transfer ☒ delayed basis ☐ recognition mode	INPUTS ☒ 3 discriminations ☒ 4 generalizations INPUTS & ACTIONS ☒ 5 associations ☒ 6 chains ACTIONS ☒ 7 generalizations ☐ partial proficiency	INPUTS ☒ A similarity (dis.) ☒ B No. of properties ☒ C No. of classes (or, No. members/class) INPUTS & ACTIONS ☒ D existing associations ☒ E length of chain ACTIONS ☒ F integrative strength	INPUTS ☒ I verbal/symbolic ☒ II environmental ☒ III audio ☒ IV non realistic ☒ V transient ACTIONS ☒ VI perceptual ☒ VII motor ☒ VIII vocal ☒ IX sub-vocal

IB. Design Criterion Practice

	GIVEN as INPUT	STUDENT WILL take ACTION	RESULTING IN OUTPUT
EXAMPLE(S) properties of additional examples	Phonoc sounds which are frequently confused (e.g., "f" and unvoiced "th" sounds) presented singly embodied in words (e.g., five, their, etc.)	Identify each sound	Correct identification of individual sounds (e.g., as a "f" sound or a "th")

IIA. Select Preparatory Practice Progression(s)

UNIT SIZE	MODE	PROMPTING/FADING	CONTENT	FREQUENCY or VARIATION
a. shaping gradual increases in quantity quality	b. R/E/P c. visual/verbal d. concrete/abstract e. procedures/principles	f. examples or demonstrations g. verbal cues h. visual cues i. diagramming, overviews	j. principles/procedures k. altered criterion/criterion l. errors/criterion m. editing/criterion n. backward chaining	o. repetition p. review q. varied examples

		2	A	B	C	D	E	F	i	vi	vii
1	q	o p	g	g				g-i	e	h	i
3	b-q	i o p	g-h-k	i-g	i					h	
4	b-q	i o p	g-h	i-g	i-g				g	h	i
3+4	b-i-q	i o p	g-h	i-g	i-g				e d e i		
5	b-o	i o p			i-g-o-p	b-g-i					
6	a-f-m-n	o p					a-n				a-m-n
7	i	o p						g-h-i			i

BASED ON A REVIEW OF
THE OPPOSITE PAGE,
FILL IN SECTION IIB

IIB Design Preparatory Practice Progression

IIC. Characterize

PROGRESSION	given as	INPUT	student will take ACTION	resulting in	OUTPUT	MODE
1st						INPUTS
						OUTPUTS
2nd						☐ i verbal/symbolic ☐ i
						☐ ii environmental ☐ ii
						☐ iii audio ☐ iii
3rd						☐ iv non-realistic ☐ iv
						☐ v transient ☐ v
						ACTIONS
						☐ vi perceptual
						☐ vii motor
						☐ viii vocal
						☐ ix subvocal

SEE ANSWERS

ANSWERS

BASED ON A REVIEW OF
THE OPPOSITE PAGE,
FILL IN SECTION IIB

IIB. Design Preparatory Practice Progression

IIC. Characterize

PROGRESSION	given as INPUT	student will take ACTION	resulting in OUTPUT	MODE	
1st	Pairs of sounds usually confused; exaggerated to emphasize difference	Indicate whether they sound the same or different	Correct identification of sameness or difference	INPUTS	OUTPUTS
				☐ I verbal/symbolic	☐ I
				☐ II environmental	☐ II
2nd	Pairs of sounds brought gradually closer to normal sound	Indicate whether they sound the same or different	Correct identification of sameness or difference	☐ III audio	☐ III
				☐ IV non-realistic	☐ IV
				☐ V transient	☐ V
3rd	A word with a single sound; incorrectly identified; instructions to correct identification	Indicate what the sound is	Correct identification of a sound	ACTIONS	
				☐ VI perceptual	
				☐ VII motor	
				☐ VIII vocal	
				☐ IX subvocal	

FOLD BACK PAGE G-49

DO NEXT PROBLEM

EXERCISE 6B

This exercise is designed to give you practice developing or designing a preparatory practice progression for:

Problem: (3) + (4) - Discriminations and Generalizations

FOLD OUT THIS PAGE

G-52 / G-53

1A. Characterize Criterion Practice Requirements

PERFORMANCE	LEARNING PROBLEMS	PROBLEM SOURCE	MODE
☐ simulation ☐ aids available ☐ two directions ☒ transfer ☒ delayed basis ☐ recognition mode	INPUTS ☒ 1 discriminations ☒ 4 generalizations INPUTS & ACTIONS ☒ 5 associations ☒ 6 chains ACTIONS ☒ 7 generalizations ☐ partial proficiency	INPUTS ☒ A similarity (dis) ☒ B No. of properties ☒ C No. of classes (or No. members/class) INPUTS & ACTIONS ☒ D existing associations ☒ E length of chain ACTIONS ☒ F integrative strength	INPUTS ☒ I verbal/symbolic ☒ II environmental ☒ III audio ☒ IV non realistic ☒ V transient ACTIONS ☒ VI perceptual ☒ VII motor ☒ VIII vocal ☒ IX sub vocal

1B. Design Criterion Practice

	GIVEN as INPUT	STUDENT WILL take ACTION	RESULTING IN OUTPUT
EXAMPLE(S) properties of additional examples	Given any example of a two-dimensional drawing of geometric figures (square, rectangle, triangle, rhombus, rhomboid, circle, or sphere)	Correctly identify it (by a label or by grouping it with other members of the same class)	Correct classification of each figure

1IA. Select Preparatory Practice Progression(s)

UNIT SIZE	MODE	PROMPTING/FADING	CONTENT	FREQUENCY or VARIATION
a. shaping gradual increases in quantity quality	b. R/E/P c. visual/verbal d. concrete/abstract e. procedures/principles	f. examples or demonstrations g. verbal cues h. visual cues i. diagramming, overviews	j. principles/procedures k. altered criterion/criterion l. errors/criterion m. editing/criterion n. backward chaining	o. repetition p. review q. varied examples

		2	A	B	C	D	E	F	I	VI	VII
1	q	o p	g	g				g i	e	h	j
3	b-q	o p	g h k	g						h	
4	b-q	o p	g h	g	g				g	h	j
3+4	(b+g)	o p	g h	g	g				g h i		
5	b-o	o p			g-o p	b-g i					
6	a-f-m-n	o p					a-n				a-m-n
7	j	o p						g h j			j

BASED ON A REVIEW OF
THE OPPOSITE PAGE,
FILL IN SECTION IIB

IIB. Design Preparatory Practice Progression

IIC. Characterize

PROGRESSION	given as	INPUT	student will take ACTION	resulting in	OUTPUT	MODE
1st						INPUTS
						☐ I verbal/symbolic
						☐ II environmental
2nd						☐ III audio
						☐ IV non-realistic
						☐ V transient
3rd						ACTIONS
						☐ VI perceptual
						☐ VII motor
						☐ VIII vocal
						☐ IX subvocal

SEE ANSWERS

ANSWERS

BASED ON A REVIEW OF
THE OPPOSITE PAGE,
FILL IN SECTION IIB

IIB. Design Preparatory Practice Progression

IIC. Characterize

PROGRESSION	given as INPUT	student will take ACTION	resulting in OUTPUT	MODE	
				INPUTS	OUTPUTS
1st	Recognition items (pairs of figures); <u>varied</u> examples	Indicate whether they are the same or different	Correct identifica- tion of sameness or differences	☐ I verbal/symbolic ☐ II environmental ☐ III audio	☐ I ☐ II ☐ III
2nd	Editing items: <u>incorrect</u> labeling or grouping of single figures; <u>varied</u> examples	Make a correction in labeling or grouping	Correction in identification of figures	☐ IV non-realistic ☐ V transient ACTIONS ☐ VI perceptual ☐ VII motor ☐ VIII vocal ☐ IX subvocal	☐ IV ☐ V ☐ VI ☐ VII ☐ VIII ☐ IX
3rd	Production items: single figures, <u>varied</u> examples; no <u>fine</u> discrimina- tions required	Label or group figures correctly	Correct identifica- tion of figures		

FOLD BACK PAGE G-53

DO NEXT PROBLEM

EXERCISE 6C

This exercise is designed to give you practice developing or designing a preparatory practice progression for:

Problem: $(3 + 4) \times (i)$ - Verbal Concepts

FOLD OUT THIS PAGE

IA. Characterize Criterion Practice Requirements

PERFORMANCE	LEARNING PROBLEMS	PROBLEM SOURCE	MODE
☐ simulation ☐ and/or available ☐ two directions ☒ transfer ☒ delayed basis ☐ recognition mode	☒ 3 INPUTS ☒ 4 discriminations ☐ generalizations ☐ 5 INPUTS & ACTIONS ☐ 6 associations ☐ chains ☐ 7 ACTIONS ☐ generalizations ☐ partial proficiency	☐ A INPUTS ☐ similarity (dis/sim) ☐ B No. of properties ☐ C No. of classes ☐ (or, No. members/class) ☐ D INPUTS & ACTIONS ☐ existing associations ☐ E length of chain ☐ F ACTIONS ☐ integrative strength	☒ I INPUTS ☒ verbal/symbolic ☐ II environmental ☐ III audio ☐ IV non realistic ☐ V transient ☐ VI ACTIONS ☐ perceptual ☐ VII motor ☒ VIII vocal ☐ IX sub-vocal

IB. Design Criterion Practice

	GIVEN as INPUT	STUDENT WILL take ACTION	RESULTING IN OUTPUT
EXAMPLE(S) properties of additional examples	The verbal descriptions of (new) examples of either operant or classical conditioning	Classify the examples	Correct classification of examples

IIA. Select Preparatory Practice Progression(s)

UNIT SIZE	MODE		PROMPTING/FADING		CONTENT		FREQUENCY or VARIATION									
a. shaping gradual increases in quantity quality	b. R/E/P	c. visual/verbal	d. concrete/abstract	e. procedures/principles	f. examples or demonstrations	g. verbal cues	h. visual cues	i. diagramming, overviews	j. principles/procedures	k. altered criterion/criterion	l. errors/criterion	m. editing/criterion	n. backward chaining	o. repetition	p. review	q. varied examples
	2	A	B	C	D	E	F	I	VI	VII						
1	q	o p	g	g			g-i	e	h	i						
3	b-q	i-o p	g h k	i g					h							
4	b-q	i-o p	g h	i g	i g			g	h	i						
3+4	b-i-q	i-o p	g h	i g	i g			e-i-o p								
5	b-o	i-o p			i g-o p	b g i										
6	a-f m-n	o p				a-m				a-m-n						
7	j	o p					g h j			i						

BASED ON A REVIEW OF
THE OPPOSITE PAGE,
FILL IN SECTION IIB

IIB. Design Preparatory Practice Progression

IIC. Characterize

PROGRESSION	given as	INPUT	student will take ACTION	resulting in	OUTPUT	MODE	
1st						INPUTS	OUTPUTS
						☐ i verbal/symbolic	☐ i
						☐ ii environmental	☐ ii
2nd						☐ iii audio	☐ iii
						☐ iv non-realistic	☐ iv
						☐ v transient	☐ v
3rd						ACTIONS	
						☐ vi perceptua.	
						☐ vii motor	
						☐ viii vocal	
						☐ ix subvocal	

SEE ANSWERS

ANSWERS

BASED ON A REVIEW OF
THE OPPOSITE PAGE,
FILL IN SECTION IIB

IIB. Design Preparatory Practice Progression

IIC. Characterize

PROGRESSION	given as	INPUT	student will take ACTION	resulting in	OUTPUT	MODE
1st	The aid of a diagram and varied examples not in the diagram provide verbal prompts		Classify examples	Classification of examples not in the diagram		INPUTS
						OUTPUTS
2nd	Give pair of examples and diagram; no verbal cues; (varied examples)		Select the example which represents each class	Selection of example from each class		I verbal/symbolic
						II environmental
						III audio
3rd	Given a single example and a verbal prompt no diagram		Classify the examples either as operant or classical conditioning	Verbal classification of example		IV non realistic
						V transient
						ACTIONS
						VI perceptual
						VII motor
						VIII vocal
						IX subvocal

FOLD BACK PAGE G-57

DO NEXT PROBLEM

EXERCISE 6D

This exercise is designed to give you practice developing or designing a preparatory practice progression for:

Problem: (5) X (C) - Multiple Associations

FOLD OUT THIS PAGE

G-60/
G-61

IA. Characterize Criterion Practice Requirements

PERFORMANCE	LEARNING PROBLEMS	PROBLEM SOURCE	MODE
☐ simulation ☐ aids available ☐ two directions ☒ transfer ☒ delayed basis ☐ recognition mode	INPUTS ☒ 3 discriminations ☒ 4 generalizations INPUTS & ACTIONS ☒ 5 associations ☒ 6 chains ACTIONS ☒ 7 generalizations ☐ partial proficiency	INPUTS ☐ A similarity (dis.) ☐ B No. of properties ☒ C No. of classes (or, No. members/class) INPUTS & ACTIONS ☐ D existing associations ☐ E length of chain ACTIONS ☐ F integrative strength	INPUTS ☒ I verbal/symbolic ☐ II environmental ☐ III audio ☐ IV non realistic ☐ V transient ACTIONS ☐ VI perceptual ☐ VII motor ☒ VIII vocal ☐ IX sub-vocal

IB. Design Criterion Practice

	GIVEN as INPUT	STUDENT WILL take ACTION	RESULTING IN OUTPUT
EXAMPLE(S) properties of additional examples	Any of the 50 states and a request for the name of the capital city	Provide the name of the capital	Correct naming of the capital

IIA. Select Preparatory Practice Progression(s)

UNIT SIZE	MODE		PROMPTING/FADING		CONTENT		FREQUENCY or VARIATION									
a. shaping gradual increases in: quantity quality	b. R/E/P	c. visual/verbal	d. concrete/abstract	e. procedures/principles	f. examples or demonstrations	g. verbal cues	h. visual cues	i. diagramming, overviews	j. principles/procedures	k. altered criterion/criterion	l. errors/criterion	m. editing/criterion	n. backward chaining	o. repetition	p. review	q. varied examples
	2	A	B	C	D	E	F	I	VI	VII						
1	a	o.p.	g	g				g j	e	h	i					
3	b-q	i-o.p.	g h k	i-g						h						
4	b-q	i-o.p.	g h	i-g	i-g				g	h	i					
3+4	b-i-q	i-o.p.	g h	i-g	i-g				c d e f							
5	<u>b-o</u>	i-o.p.		<u>i-g-o-p</u>	b-g-i											
6	a-f-m-n	o.p.				a-n					a m n					
7	i	o.p.					g h j				i					

BASED ON A REVIEW OF
THE OPPOSITE PAGE,
FILL IN SECTION IIB

IIB. Design Preparatory Practice Progression

IIC. Characterize

PROGRESSION	given as	INPUT	student will take ACTION	resulting in	OUTPUT	MODE
						INPUTS OUTPUTS
1st						I verbal/symbolic II environmental III audio
2nd						IV non-realistic V transient ACTIONS
3rd						VI perceptual VII motor VIII vocal IX subvocal

SEE ANSWERS

ANSWERS

BASED ON A REVIEW OF
THE OPPOSITE PAGE,
FILL IN SECTION IIB

IIB Design Preparatory Practice Progression

IIC Characterize

PROGRESSION	given as INPUT	student will take ACTION	resulting in OUTPUT	MODE	
1st	A table with all the states and their capitals	Look at the name of the state and say the capital 2 or 3 repetitions	Statement of correct capital	INPUTS	OUTPUTS
				☐ I verbal/symbolic	☐ I
				☐ II environmental	☐ II
	Four or five states and four or five capitals (at a time)	Match states and capitals (recognition)	Correct matching	☐ III audio	☐ III
				☐ IV non-realistic	☐ IV
				☐ V transient	☐ V
3rd	States and a clue as to the capital (e.g., first letter)	State name of capital	Statement of correct capital	ACTIONS	
				☐ VI perceptual	
				☐ VII motor	
				☐ VIII vocal	
				☐ IX subvocal	

FOLD BACK PAGE G-61

DO NEXT PROBLEM

EXERCISE 6E

This exercise is designed to give you practice developing or designing a preparatory practice progression for:

Problem: (6) X (E) - A Long Chain

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G-64/
G-65

IA. Characterize Criterion Practice Requirements

PERFORMANCE	LEARNING PROBLEMS	PROBLEM SOURCE	MODE
☐ simulation ☐ aids available ☐ two directions ☒ transfer ☒ delayed basis ☐ recognition mode	INPUTS ☒ 3 discriminations ☒ 4 generalizations INPUTS & ACTIONS ☒ 5 associations ☒ 6 chains ACTIONS ☒ 7 generalizations ☐ partial proficiency	INPUTS ☒ A similarity (dis.) ☒ B No. of properties ☒ C No. of classes (or, No. members/class) INPUTS & ACTIONS ☒ D existing associations ☒ E length of chain ACTIONS ☒ F integrative strength	INPUTS ☒ I verbal/symbolic ☒ II environmental ☒ III audio ☒ IV non realistic ☒ V transient ACTIONS ☒ VI perceptual ☒ VII motor ☒ VIII vocal ☒ IX sub-vocal

IB. Design Criterion Practice

	GIVEN as INPUT	STUDENT WILL take ACTION	RESULTING IN OUTPUT
EXAMPLE(S) properties of additional examples	Any automobile with an out-of-tune engine plus Manufacturer's specifications for tuning	Complete a tune-up to manufacturer's specifications. There are twenty steps in the procedure.	Correctly tuned engine

IIA. Select Preparatory Practice Progression(s)

UNIT SIZE	MODE		PROMPTING/FADING		CONTENT		FREQUENCY or VARIATION									
a. shaping gradual increases in quantity quality	b. R/E/P	c. visual/verbal	d. concrete/abstract	e. procedures/principles	f. examples or demonstrations	g. verbal cues	h. visual cues	i. diagramming, overviews	j. principles/procedures	k. altered criterion/criterion	l. errors/criterion	m. editing/criterion	n. backward chaining	o. repetition	p. review	q. varied examples
	2	A	B	C	D	E	F	I	VI	VII						
1	q	o-p	g	g				g-i	e	h	i					
3	b-q	i-o-p	g-h-k	i-g	i					h						
4	b-q	i-o-p	g-h	i-g	i-g				g	h	i					
3+4	b-i-q	i-o-p	g-h	i-g	i-g				i-d-e-i							
5	b-o	i-o-p			i-g-o-p	b-g-i										
6	a-f-m-n	o-p					a-f				a-m-n					
7	j	o-p						g-h-j			j					

BASED ON A REVIEW OF
THE OPPOSITE PAGE,
FILL IN SECTION IIB

IIB. Design Preparatory Practice Progression

IIC. Characterize

PROGRESSION	given as	INPUT	student will take ACTION	resulting in	OUTPUT	MODE	
1st						INPUTS	OUTPUTS
						☐ i verbal/symbolic	☐ i
						☐ ii environmental	☐ ii
2nd						☐ iii audio	☐ iii
						☐ iv non-realistic	☐ iv
						☐ v transient	☐ v
3rd						ACTIONS	
						☐ vi perceptual	
						☐ vii motor	
						☐ viii vocal	
						☐ ix subvocal	

SEE ANSWERS

ANSWERS

BASED ON A REVIEW OF
THE OPPOSITE PAGE,
FILL IN SECTION IIB

IIB Design Preparatory Practice Progression

IIC. Characterize

PROGRESSION	given as	INPUT	student will take ACTION	resulting in	OUTPUT	MODE	
1st	Each step in the chain is demonstrated by the instruction		Practice each step by itself	Practice of individual steps, not the complete chain		INPUTS	OUTPUTS
						☐ I verbat/symbolic	☐ I
						☐ II environmental	☐ II
2nd	Demonstration of combined steps in procedure		Critiques performance, or practices combined steps	Verbal critique of performance, or practice of multiple steps		☐ III audio	☐ III
						☐ IV non-realistic	☐ IV
						☐ V transient	☐ V
3rd	Manufacturer's specifications plus guidance of instructor		Practice entire chain	Engine tuned		ACTIONS	
						☐ VI perceptual	
						☐ VII motor	
						☐ VIII vocal	
						☐ IX subvocal	

FOLD BACK PAGE G-65

DO NEXT PROBLEM

EXERCISE 6F

This exercise is designed to give you practice developing or designing a preparatory practice progression for:

Problem: $(3 + 4) \times (i) + (6)$ - A Long Chain Involving Verbal Concepts

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G-68/
G-69

IA. Characterize Criterion Practice Requirements

PERFORMANCE	LEARNING PROBLEMS	PROBLEM SOURCE	MODE
☐ simulation ☐ aids available ☐ two directions ☒ transfer ☒ delayed basis ☐ recognition mode	☒ 1 ☒ 3 ☒ 5 ☒ 6 ☐ 7 ☐ partial proficiency	☐ A ☐ B ☐ C ☐ D ☐ E ☐ F	☒ I ☐ II ☐ III ☐ IV ☐ V ☐ VI ☐ VII ☐ VIII ☐ IX

IB. Design Criterion Practice

	GIVEN as INPUT	STUDENT WILL take ACTION	RESULTING IN OUTPUT
EXAMPLE(S) properties of additional examples	The term "shaping" and instructions to define it, giving (new) examples of it	Define the term in his own words and cite examples of it for situations not covered in instruction	Correct definition and examples

IIA. Select Preparatory Practice Progression(s)

UNIT SIZE	MODE		PROMPTING/FADING		CONTENT		FREQUENCY or VARIATION			
a. shaping gradual increases m. quantity quality	b. R/E/P c. visual/verbal d. concrete/abstract e. procedures/principles	f. example or demonstrations g. verbal cues h. visual cues i. diagramming, overviews	j. principles/procedures k. altered criterion/criterion l. errors/criterion m. editing/criterion n. backward chaining	o. repetition p. review q. varied examples						
	2	A	B	C	D	E	F	I	VI	VII
1	q	o.p	g	g			g-i	e	h	i
3	b-q	i.p.p	g-h-k	i-g					h	
4	b-q	i.o.p	g-h	i-g	i-g			g	h	i
3+4	(b+g)	i.o.p	g-h	i-g	i-g			(c-d-e-i)		
5	b-o	i.o.p			i-g-o-p	b-g-i				
6	(a-f-m-n)	o.p					a-n			a-m-n
7	i	o.p					g-h-i			i

BASED ON A REVIEW OF
THE OPPOSITE PAGE,
FILL IN SECTION IIB

IIB. Design Preparatory Practice Progression

IIC. Characterize

PROGRESSION	given as	INPUT	student will take ACTION	resulting in	OUTPUT	MODE	
						INPUTS	OUTPUTS
1st						☐ I verbal/symbolic	☐ I
						☐ II environmental	☐ II
						☐ III audio	☐ III
2nd						☐ IV non-realistic	☐ IV
						☐ V transient	☐ V
3rd						ACTIONS	
						☐ VI perceptual	
						☐ VII motor	
						☐ VIII vocal	
						☐ IX subvocal	

SEE ANSWERS

ANSWERS

BASED ON A REVIEW OF
THE OPPOSITE PAGE,
FILL IN SECTION IIB

IIB. Design Preparatory Practice Progression

IIC. Characterize

PROGRESSION	given as INPUT	student will take ACTION	resulting in OUTPUT	MODE	
1st	Diagram defining a constituent concept involved in "shaping" (e.g., increments); and pairs of relevant examples	Choose examples of each concept	Correct identification of examples illustrating a concept	INPUTS	OUTPUTS
				☐ I verbal/symbolic	☐ I
				☐ II environmental	☐ II
2nd	Same as above but for a different concept (e.g., reinforcement)	Choose examples of each concept	Correct identification of examples illustrating a concept	☐ III audio	☐ III
				☐ IV non-realistic	☐ IV
				☐ V transient	☐ V
3rd	Diagrams linking two or more concepts; problems	Select from options correct linkages of problems	Correct identification of how two or more constituent concepts are linked together	ACTIONS	
				☐ VI perceptual	
				☐ VII motor	
				☐ VIII vocal	
				☐ IX subvocal	

FOLD BACK PAGE G-69

DO NEXT PROBLEM

EXERCISE 6G

This exercise is designed to give you practice developing or designing a preparatory practice progression for:

Problem: $(3 + 4) + (6) + (7)$ - Problem-Solving Chain

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G-72/G-73

IA. Characterize Criterion Practice Requirements

PERFORMANCE	LEARNING PROBLEMS	PROBLEM SOURCE	MODE
☐ imitation ☐ adds variable ☐ two directions ☒ transfer ☒ delayed basis ☐ recognition mode	☒ 3 INPUTS: discrimination ☒ 4 generalizations ☒ 5 INPUTS & ACTIONS: associations ☒ 6 chains ☒ 7 ACTIONS: generalizations ☐ partial proficiency	☒ A INPUTS: similarity (dis.) ☒ B No. of properties ☒ C No. of classes (or No. members/class) ☒ D INPUTS & ACTIONS: existing associations ☒ E length of chain ☒ F ACTIONS: integrative strength	INPUTS OUTPUTS ☒ I verbal/symbolic ☒ I ☒ II environmental ☒ II ☒ III audio ☒ III ☒ IV non realistic ☒ IV ☒ V transient ☒ V ACTIONS ☒ VI perceptual ☒ VIII vocal ☒ VII motor ☒ IX sub-vocal

IB. Design Criterion Practice

	GIVEN as	INPUT	STUDENT WILL take ACTION	RESULTING IN OUTPUT
EXAMPLE(S) properties of additional examples	Child exhibits a behavior problem in class (new example)		Take appropriate ACTION (varied from what was practiced) over a period of time	Diminution of problem

IIA. Select Preparatory Practice Progression(s)

UNIT SIZE	MODE		PROMPTING/FADING		CONTENT		FREQUENCY or VARIATION			
a. shaping gradual increases in quantity quality	b. R/E/P c. visual/verbal d. concrete/abstract e. procedures/principles	f. examples or demonstrations g. verbal cues h. visual cues i. diagramming, overviews	j. principles/procedures k. altered criterion/ criterion l. errors/criterion m. editing/criterion n. backward chaining	o. repetition p. review q. varied examples						
	2	A	B	C	D	E	F	I	VI	VII
1	q	o p	g	g			g i	e	h	i
3	b-q	i o p	g h k	i g					h	
4	b-q	i o p	g h	i g	i g			g	h	i
3+4	b-i q	i o p	g h	i g	i g			i d e s		
5	b-c	i o p		i g o p	b-g i					
6	a-f-m-n	o p				a-n				a-m-n
7	i	o p					g h i			i

BASED ON A REVIEW OF
THE OPPOSITE PAGE,
FILL IN SECTION IIB

IIB. Design Preparatory Practice Progression

IIC. Characterize

PROGRESSION	given as	INPUT	student will take ACTION	resulting in	OUTPUT	MODE	
1st						INPUTS	OUTPUTS
						☐ i verbal/symbolic	☐ i
						☐ ii environmental	☐ ii
2nd						☐ iii audio	☐ iii
						☐ iv non-realistic	☐ iv
						☐ v transient	☐ v
3rd						ACTIONS	
						☐ vi perceptual	
						☐ vii motor	
						☐ viii vocal	
						☐ ix subvocal	

SEE ANSWERS

ANSWERS

BASED ON A REVIEW OF
THE OPPOSITE PAGE,
FILL IN SECTION IIB

IIB. Design Preparatory Practice Progression

IIC. Characterize

PROGRESSION	given as	INPUT	student will take ACTION	resulting in	OUTPUT	MODE
1st	Diagrams explaining and illustrating types of problems; example of problem and options as to type	Identify from options types of problem involved in example	Correct identification of problem type	INPUTS	OUTPUTS	
				☐ I	verbal/symbolic	☐ I
				☐ II	environmental	☐ II
				☐ III	audio	☐ III
2nd	Diagrams explaining and illustrating types of management strategies; examples of strategies and options as to type	Identify from options types of management solutions involved in example	Correct identification of management type	☐ IV	non-realistic	☐ IV
				☐ V	transient	☐ V
				ACTIONS		
				☐ VI	perceptual	
				☐ VII	motor	
				☐ VIII	vocal	
				☐ IX	subvocal	
3rd	Diagrams showing matching of problems and strategies; practice problems with options	Matches problems and strategies from options	Correct matching			

FOLD BACK PAGE G-73

END OF EXERCISE

Exercises 7A-7C are designed to give you practice in designing feedback to be given to students.

TURN TO NEXT PAGE FOR PROBLEMS.

EXERCISE 7A

For each criterion performance below indicate with an X whether the feedback is likely to be trainer-produced or student-produced.

	Criterion Performance	Produced by:	
		Student	Trainer
1.	Stating the consequences of applying and removing stress to perfectly elastic bodies.		
2.	Identifying the name of a Supreme Court case from a description of the case.		
3.	Drawing the orthographic projection of the end and side views of a prism.		
4.	Drawing a circle with the aid of a compass.		
5.	Focusing a television camera using the automatic or manual focus.		
6.	Given a declarative statement in Spanish, the student will transform it into a question in Spanish.		
7.	Taking the correct grip on a golf club.		
8.	Removing and replacing fuel filter and checking for leaks.		
9.	Identifying objects which belong to the same class.		
10.	Lowering an object attached to a scale into water to determine what will happen to the scale reading.		

ANSWERS

EXERCISE 7A

For each criterion performance below indicate with an X whether the feedback is likely to be trainer-produced or student-produced.

	Criterion Performance	Produced by:	
		Student	Trainer
1.	Verbally stating the consequences of applying and removing stress to perfectly elastic bodies.		X
2.	Identifying the name of a Supreme Court case from a description of the case (in a programmed text).		X
3.	Identifying the orthographic projection of the end and side views of a prism.		X
4.	Drawing a circle with the aid of a compass.	X	
5.	Focusing a television camera using the automatic or manual focus.	X	
6.	Given a declarative statement in Spanish, the student will transform it into a question in Spanish.		X
7.	Taking the correct grip on a golf club.		X
8.	Removing and replacing fuel filter and checking for leaks.	X	
9.	Identifying objects which belong to the same class.		X
10.	Lowering an object attached to a scale into water to determine what will happen to the scale reading.	X	

EXERCISE 7B

Put an X through the description of the feedback example which is more likely to assist learning.

Practice Situation		Feedback A		Feedback B	
1.	TV cameraman is practicing "shooting" a simulated interview show.	Critique by the director regarding appropriate and inappropriate shots.		Video replay of interview show with accompanying critique.	
2.	Teacher practices reinforcing longer and longer durations of a child's attending behavior.	Teacher describes her classroom performance and it is critiqued to an expert in behavior modification.		A checklist of do's and don't's by which the teacher can evaluate her performance.	
3.	$[(3)(4) \times 3] [2] = x$	Present all steps: $[(3)(4) \times 3] [2] = x$ $[12 \times 3] [2] = x$ $(36)(2) = x$ $72 = x$		Present answer: $72 = x$	
4.	Given a set of sentences requiring the insertion of commas, the student will rewrite the sentences using the appropriate punctuation.	Present the same sentences already correctly punctuated.		Supply a set of rules for the use of commas.	
5.	Setting a still camera for shutter speed and lens opening for various types of lighting.	Present as a model various types of lighting conditions. Correct shutter and lens settings and types of photographs which result from them.		Present as a model various types of lighting conditions and correct shutter and lens settings.	

EXERCISE 7B

Put an X through the description of the feedback example which is more likely to assist learning.

Practice Situation

Feedback A

Feedback B

1. TV cameraman is practicing "shooting" a simulated interview show.

Critique by the director regarding appropriate and inappropriate shots.

Video replay of interview show with accompanying critique.

2. Teacher practices reinforcing longer and longer durations of a child's attending behavior.

Teacher describes her classroom performance and it is critiqued to an expert in behavior modification

A checklist of do's and don't's by which the teacher can evaluate her performance.

3. $[(3)(4) \times 3] [2] = x$

Present all steps:
 $[(3)(4) \times 3] [2] = x$
 $[12 \times 3] [2] = x$
 $(36)(2) = x$
 $72 = x$

Present answer:
 $72 = x$

4. Given a set of sentences requiring the insertion of commas, the student will rewrite the sentences using the appropriate punctuation.

Present the same sentences already correctly punctuated.

Supply a set of rules for the use of commas.

5. Setting a still camera for shutter speed and lens opening for various types of lighting.

Present as a model various types of lighting conditions. Correct shutter and lens settings and types of photographs which result from them.

Present as a model various types of lighting conditions and correct shutter and lens settings.

EXERCISE 7C

For each of the following situations describe the feedback you would provide if you were developing the instructional materials.

	Practice Situation	Feedback After Learner Gives Answer
1.	Demonstration of Bernoulli's principle: "If I blow air between these candle flames, will the flames bend this way or this way?"	
2.	Translation of Russian press release into English. "Edit this incorrect translation."	
3.	Children are learning to classify examples of "fruits." Shown a banana, apple, orange, and artichoke. "Which of these does not belong with the others?"	
4.	You're going to see a 300 lb. rock and a 10 lb. rock dropped from a bridge. "Which will land first?"	
5.	Here is a task analysis of a performance in the knowledge domain. Now perform the <u>learning</u> analysis.	

SEE ANSWERS

ANSWERS

EXERCISE 7C

For each of the following situations describe the feedback you would provide if you were developing the instructional materials.

	Practice Situation	Feedback After Learner Gives Answer
1.	Demonstration of Bernoulli's principle: "If I blow air between these candle flames, will the flames bend this way or this way?"	<i>Show the way the flames actually bend (i.e., inward).</i>
2.	Translation of Russian press release into English. "Edit this incorrect translation."	<i>Show the correct editing, i.e., the exact changes in the translation he should have made.</i>
3.	Children are learning to classify examples of "fruits." Shown a banana, apple, orange, and artichoke. "Which of these does not belong with the others?"	<i>Point to the artichoke and say, "This one because an artichoke is a vegetable and the others are fruits."</i>
4.	You're going to see a 300 lb. rock and a 10 lb. rock dropped from a bridge. "Which will land first?"	<i>Show results: simultaneous landing.</i>
5.	Here is a task analysis of a performance in the knowledge domain. Perform the learning analysis.	<i>Show results of a trainer-developed learning analysis.</i>

END OF EXERCISE

After reading
Handbook for
sub-STEP(S)

G.3.3-G.3.4

DO
EXERCISE

8

Exercises 8A-8C are designed to give you practice in designing the reinforcement to be provided students either during or following instruction.

TURN TO NEXT PAGE FOR PROBLEMS

EXERCISE 8A

With an X indicate the type of reinforcers used in the examples below.

	Example of Reinforcers	Intrinsic	Extrinsic
1.	The teacher schedules math and then art because the class likes art; they then do better on math; the reinforcement <u>for</u> math is:		
2.	The reinforcement for <u>art</u> in the above example (1) is:		
3.	To demonstrate how economic conditions restrict personal development, the teacher had the class play a game which simulated ghetto conditions.		
4.	The teacher knows that Ben is a baseball fan. She gives him math problems which involve batting averages.		
5.	The teacher knows that Ben is a baseball fan. He tells Ben that if he completes all of his math assignments, he will allow Ben to listen to the baseball playoffs on Friday.		
6.	The students are required to write a research paper on the use of media in instruction. Within this broad framework, the student may select a topic which most interests him.		
7.	In order to encourage dropouts to remain in school, the principal promised to give a transistor radio to any student who scored 80 or above on a criterion test.		
8.	Every time Johnny works quietly on his spelling, the teacher gives him a gold star.		
9.	Ann selects the songs she wants to learn on the guitar. Her teacher adapts them to her level.		
10.	The teacher finds that all it takes to keep Johnny attentive is to call on him to recite occasionally.		

ANSWERS

EXERCISE 8A

With an X indicate the type of reinforcers used in the examples below.

	Example of Reinforcers	Intrinsic	Extrinsic
1.	The teacher schedules math and then art because the class likes art; they then do better on math; the reinforcement <u>for</u> math is:		X
2.	The reinforcement for <u>art</u> in the above example (1) is:	X	
3.	To demonstrate how economic conditions restrict personal development, the teacher had the class play a game which simulated ghetto conditions.	X	
4.	The teacher knows that Ben is a baseball fan. She gives him math problems which involve batting averages.	X	
5.	The teacher knows that Ben is a baseball fan. He tells Ben that if he completes all of his math assignments, he will allow Ben to listen to the baseball playoffs on Friday.		X
6.	The students are required to write a research paper on the use of media in instruction. Within this broad framework, the student may select a topic which most interests him.	X	
7.	In order to encourage dropouts to remain in school, the principal promised to give a transistor radio to any student who scored 80 or above on a criterion test.		X
8.	Every time Johnny works quietly on his spelling, the teacher gives him a gold star.		X
9.	Ann selects the songs she wants to learn on the guitar. Her teacher adapts them to her level.	X	
10.	The teacher finds that all it takes to keep Johnny attentive is to call on him to recite occasionally.		X

EXERCISE 8B

With an X indicate for each of the following situations whether the teacher is attempting to strengthen or to maintain persistence at work.

	Reinforcement Practice	Strengthen	Maintain
1.	Johnny's teacher told him she would give him a gold star for every line he wrote in his journal.		
2.	On Monday Johnny's teacher told him she would give him a gold star for one line of writing; on Tuesday she required two lines, and continued increasing the amount he had to produce in order to receive his reward.		
3.	Betty rarely works for a couple of minutes at a time. Her teacher decided to reward her with candy for working steadily for an entire class period. After Betty reached the "hour" goal, the teacher began giving her candy at regular intervals.		
4.	At the onset of the school year the teacher accepted a very low standard of writing from the children. She praised almost any kind of writing. As the year wore on she would only praise better and better examples of writing and did so only on occasion.		
5.	To encourage his students to exercise, the gym teacher posted the names of people who had completed the daily exercise requirements. He started easy in the fall but ended hard at the end of the term.		

ANSWERS

EXERCISE 8B

With an X indicate for each of the following situations whether the teacher is attempting to strengthen or to maintain persistence at work.

	Reinforcement Practice	Strengthen	Maintain
1.	Johnny's teacher told him she would give him a gold star for every line he wrote in his journal.	X	
2.	On Monday Johnny's teacher told him she would give him a gold star for one line of writing; on Tuesday she required two lines, and continued increasing the amount he had to produce in order to receive his reward.	X	
3.	Betty rarely works for a couple of minutes at a time. Her teacher decided to reward her with candy for working steadily for an entire class period. After Betty reached the "hour" goal, the teacher began giving her candy at regular intervals.		X
4.	At the onset of the school year the teacher accepted a very low standard of writing from the children. She praised almost any kind of writing. As the year wore on she would only praise better and better examples of writing and did so only on occasion.		X
5.	To encourage his students to exercise, the gym teacher posted the names of people who had completed the daily exercise requirements. He started easy in the fall but ended hard at the end of the term.	X	

EXERCISE 8C

Draw an X through the one type of behavior in each pair (A or B) which you feel requires reinforcement to be delivered following instruction.

Behavior A

Behavior B

1.	Citing the disadvantages of using drugs.	Refraining from using drugs.
2.	Going to the polls to vote.	Explaining the consequences for democratic government of voter apathy.
3.	Supervisory foreman behaving toward subordinates in a way that shows respect for them as individuals.	Supervisory foreman cites reasons for good interpersonal relations between superiors and subordinates.
4.	Student refrains from smoking in prohibited area.	Student states what the dangers are of smoking in a prohibited area.
5.	Listing what should be done to prevent V.D.	Observing precautions against V.D.

SEE ANSWERS

ANSWERS

EXERCISE 8C

Draw an X through the one type of behavior in each pair (A or B) which you feel requires reinforcement to be delivered following instruction.

	Behavior A	Behavior B
1.	Citing the disadvantages of using drugs.	~~Refraining from using drugs.~~
2.	~~Going to the polls to vote.~~	Explaining the consequences for democratic government of voter apathy.
3.	~~Supervisory foreman behaving toward subordinates in a way that shows respect for them as individuals.~~	Supervisory foreman cites reasons for good interpersonal relations between superiors and subordinates.
4.	~~Student refrains from smoking in prohibited area.~~	Student states what the dangers are of smoking in a prohibited area.
5.	Listing what should be done to prevent V.D.	~~Observing precautions against V.D.~~

END OF EXERCISE

After reading
Handbook for
sub-STEP(S)

G.4.1-G.4.2

DO
EXERCISE

9

Exercises 9A-9E are designed to give you practice in identifying media requirements and making media decisions.

TURN TO NEXT PAGE FOR PROBLEMS

EXERCISE 9A

For each learning situation below indicate with an X all the instructional capabilities the selected medium does NOT possess.

	TO BE LEARNED	MEDIUM SELECTED	Display of	Accommodation	Provides a
			INPUTS/OUTPUTS	of ACTIONS	Record
1.	Applying a correct hold to a drowning victim.	Film showing the drowning victim thrashing about.			
2.	Where to enter electrical circuits to troubleshoot for a short in the circuit.	Circuit diagram with student putting marks on diagram for points to enter for testing.			
3.	Reading words not encountered before (phonics lesson).	Slides of new words; students say them aloud.			
4.	Using reinforcement principles to manage classroom behavior.	Film showing third graders being inattentive.			
5.	Translating from Chinese characters aloud.	Tape recorder.			

ANSWERS

EXERCISE 9A

For each learning situation below indicate with an X all the instructional capabilities the selected medium does NOT possess.

	TO BE LEARNED	MEDIUM SELECTED	Accommodation		Provides a Record
			Display of INPUTS/OUTPUTS	of ACTIONS	
1.	Applying a correct hold to a drowning victim.	Film showing the drowning victim thrashing about.		X	X
2.	Where to enter electrical circuits to troubleshoot for a short in the circuit.	Circuit diagram with student putting marks on diagram for points to enter for testing.			
3.	Reading words not encountered before (phonics lesson).	Slides of new words; students say them aloud.			X
4.	Using reinforcement principles to manage classroom behavior.	Film showing third graders being inattentive.		X	X
5.	Translating from Chinese characters aloud.	Tape recorder.	X		

EXERCISE 9B

This is an editing exercise.

Your task is to correct the instructional deficiencies created by the medium selected (in the previous exercise) DO NOT LOOK AT THE PREVIOUS EXERCISE.

TO BE LEARNED	MEDIUM SELECTED	YOUR IMPROVEMENT
1. Applying a correct hold to a drowning victim.	Film showing the drowning victim thrashing about.	
2. Where to enter electrical circuits to troubleshoot for a short in the circuit.	Circuit diagram with student putting marks on diagram for points to enter for testing.	
3. Reading words not encountered before (phonics lesson).	Slides of new words; students say them aloud.	
4. Using reinforcement principles to manage classroom behavior.	Film showing third graders being inattentive.	
5. Translating from Chinese characters aloud.	Tape recorder.	

SEE ANSWERS

ANSWERS

EXERCISE 9B

This is an editing exercise.

Your task is to correct the instructional deficiencies created by the medium selected (in the previous exercise).
DO NOT LOOK AT THE PREVIOUS EXERCISE.

TO BE LEARNED	MEDIUM SELECTED	YOUR IMPROVEMENT
1. Applying a correct hold to a drowning victim.	Film showing the drowning victim thrashing about.	Paper and pencil to allow student to say what he would do.
2. Where to enter electrical circuits to troubleshoot for a short in the circuit.	Circuit diagram with student putting marks on diagram for points to enter for testing.	None.
3. Reading words not encountered before (phonics lesson).	Slides of new words; students say them aloud.	Tape recorder to provide a record.
4. Using reinforcement principles to manage classroom behavior.	Film showing third graders being inattentive.	Paper and pencil to allow teachers to say what they would do; OR, role-playing to let them practice doing it with filming of it to provide a record.
5. Translating from Chinese characters aloud.	Tape recorder.	To display INPUTS, <u>printed</u> Chinese characters.

DO NEXT PROBLEM

EXERCISE 9C

Put an X through the best use of a medium for the inputs/outputs to be displayed. The medium should be neither overutilized nor underutilized.

TO BE DISPLAYED		MEDIA USED		
		A.	B.	C.
1.	Orbits of planets	Drawing showing relative size and distance of planets.	Mobile using spheres of varying sizes and distances from one another; spheres circle the center sphere.	Stationary version of mobile in Example B.
2.	Anatomy of eye	Cutaway line drawing of eye showing interior and exterior parts.	Opaque 3D model of eye showing exterior parts.	Transparent plastic 3D eye showing interior and exterior parts.
3.	Movement of bull in bullfight	Film of bull from point of view of bullfighter.	Simulated bull which can recreate actual movements.	Series of still photographs showing changes in movement.
4.	Shape of diamonds	Glass cut like diamonds.	Opaque model of diamonds.	Photograph of diamonds.
5.	Cooking sauce	Color photographs of sauce.	Black and white photographs of sauce.	Mock sauce with full visual properties.

SEE ANSWERS

ANSWERS

EXERCISE 9C

Put an X through the best use of a medium for the inputs/outputs to be displayed. The medium should be neither overutilized nor underutilized.

TO BE DISPLAYED

1.	Orbits of planets
2.	Anatomy of eye
3.	Movement of bull in bullfight
4.	Shape of diamonds
5.	Cooking sauce

A.

Drawing showing relative size and distance of planets.
Cutaway line drawing of eye showing interior and exterior parts.
Film of bull from point of view of bullfighter.
~~Glass-cut like diamonds.~~
Color photographs of sauce.

MEDIA USED

B.

~~Mobile using spheres of varying sizes and distances from one another; spheres circle the center circle.~~
Opaque 3D model of eye showing exterior parts.
~~Simulated bull which can recreate actual movements.~~
Opaque model of diamonds.
Black and white photographs of sauce.

C.

Stationary version of mobile in Example B.
~~Transparent plastic 3D eye showing interior and exterior parts.~~
Series of still photographs showing changes in movement.
Photograph of diamonds.
~~Mock sauce with full visual properties.~~

DO NEXT PROBLEM

EXERCISE 9D

Put an X through the MEDIUM which would be the most desirable from a logistical point (i.e., the smallest logistical burden would be involved).

	INPUT	ACTION	A.	B.	C.
1.	Damaged corn, wheat, soy-beans	Identifies insect responsible for damage	Samples of actual damaged crops	Enlarged photographs of damaged crops	Verbal descriptions of what damaged crops look like
2.	Patient with eye condition	Diagnoses problem	Color photographs	Color motion picture film	Black and white photographs
3.	Electronic malfunction symptoms	Locates malfunction in circuit	Printed descriptions of symptoms	Photographs of symptoms	Three-dimensional mock-up with symptoms displayed
4.	Sound, cracked, or sagging foundation	Evaluates soundness	Samples (actual houses)	Three-dimensional small scale models	Photographs of foundations
5.	Damaged exhaust analyzer	Disassembles exhaust analyzer and replaces it	Three-dimensional functioning mock-up of lunar rover	Diagram showing location of parts of lunar rover	Film of assembly and disassembly of lunar rover

SEE ANSWERS

ANSWERS

EXERCISE 90

Put an X through the MEDIUM which would be the most desirable from a logistical point (i.e., the smallest logistical burden would be involved).

		MEDIA		
		A.	B.	C.
1.	Damaged corn, wheat, soy-beans	Identifies insect responsible for damage	Samples of actual damaged crops	Enlarged photographs of damaged crops
2.	Patient with eye condition	Diagnoses problem	Color photographs	Color motion picture film
3.	Electronic malfunction symptoms	Locates malfunction in circuit	Printed descriptions of symptoms	Photographs of symptoms
4.	Sound, cracked, or sagging foundation	Evaluates soundness	Samples (actual houses)	Three-dimensional small scale models
5.	Damaged exhaust analyzer and replaces it	Disassembles exhaust analyzer and replaces it	Three-dimensional functioning mock-up of lunar rover	Diagram showing location of parts of lunar rover
				Verbal description of what damaged crops look like
				Black and white photographs
				Three-dimensional mock-up with symptoms displayed
				Photographs of foundations
				Film of assembly and disassembly of lunar rover

DO NEXT PROBLEM

EXERCISE 9E

For the examples below create an example of medium selection which you feel is a good compromise between what is offered as "best" from an instructional and from a logistical point of view.

INPUT ACTION OUTPUT		BEST INSTRUCTIONAL		BEST LOGISTICAL		COMPROMISE	
1.	Facial expression of patient	Analyst deals with patient	Best patient treatment	An actor simulating the role, patients with which analyst practices correct action	Concrete, verbally described situation, and analyst produces correct action in writing		
2.	Medieval and renaissance baroque, in treatment of paintings of light	Analyze	Paintings analyzed	Full color printed high quality reproductions	Black and white reproductions from textbooks shown with aid of overhead projector		
3.	Patient with broken leg to be X-rayed	Position leg and operate to be controls	Patient and X-rayed	Training model of machine with working controls and someone acting as patient; learner produces actions	Drawing of controls and correct and incorrect positioning of arm; learner verbalizes and identifies correct actions		
4.	TV monitor showing traffic problems	Identify and report troubles	Problems reported	TV tape showing typical traffic problems	Schematic sketch of traffic problems		
5.	Moving blip on radar screen	Orally identify position of blip to pilots	Position identified	Film of blip moving across radar screen	Drawing of blip "path"		

SEE ANSWERS

ANSWERS

EXERCISE 9E

For the examples below create an example of medium selection which you feel is a good compromise between what is offered as "best" from an instructional and from a logistical point of view.

	INPUT	ACTION	OUTPUT	BEST INSTRUCTIONAL	BEST LOGISTICAL	COMPROMISE
1.	Facial expression of patient	Analyst deals with patient	Best patient treatment	An actor simulating the role, patients with which analyst practices correct action	Concrete, verbally described situation, and analyst produces correct action in writing	Photographs of facial expressions to which analyst responds (on paper)
2.	Medieval and renaissance baroque paintings	Analyze for difference in treatment of light	Paintings analyzed	Full color printed high quality reproductions	Black and white reproductions from textbooks shown with aid of overhead projector	Colored slides of painting plus paper and pencil
3.	Patient with broken leg to be X-rayed	Position leg and operate controls	Patient X-rayed	Training model of machine with working controls and someone acting as patient; learner produces actions	Drawing of controls and correct and incorrect positioning of arm; learner verbalizes and identifies correct actions	Mock-up of machine with non-functioning controls and someone acting as patient; learner simulates setting controls on mock-up
4.	TV monitor showing traffic problems	Identify and report troubles	Problems reported	TV tape showing typical traffic problems	Schematic sketch of traffic problems	Photographs of backed-up traffic and paper and pencil for answers
5.	Moving blip on radar screen	Orally identify position to pilots	Position identified to pilots	Film of blip moving across radar screen	Drawing of blip "path"	Mechanical model with hand-operated discs showing moving blips, and audio tape

END OF EXERCISE

NOW DO FINAL EXERCISE

#3

WHICH APPEARS IN THE
FINAL EXERCISES VOLUME

FOLD BACK THE BLUE PAGE

G-104/ G-105

FOLD OUT THIS PAGE AND
FOLLOW THE "F" SCHEDULE INSIDE

EXERCISES FOR TASK F

	After Reading HANDBOOK Sections	On HANDBOOK Pages	Do WORKBOOK Exercises	On WORKBOOK Pages	Type of Practice
1.	F.1.1 - F.2.1	1 - 39	1	F1 - F3	Deciding to test for criterion and subcrit outputs
2.	F.2.2	41 - 47	2	F5 - F7	How much of criterion behavior to sample in tests
3.	F.2.3	49 - 69	3A - 3F	F9 - F29	Developing test items
4.	F.2.4 - F.3.1	71 - 107	4A - 4B	F31 - F35	Identifying error patterns on test results
5.	F.3.2	109 - 129	5	F37 - F39	Developing probes to follow up student test errors
6.	F.3.3	131 - 145	6*	F41 - F43	Developing diagnostic test items
7.	F.4.1 - F.4.2	147 - 171	-----	-----	Trying out and reusing testing procedures
8.	*WHEN YOU HAVE COMPLETED ALL THE EXERCISES IN THIS SECTION OF THE WORKBOOK, PROCEED TO FINAL EXERCISE #4 IN THE FINAL EXERCISES VOLUME.				

After reading
Handbook for
sub-STEP(S)

F.1.1-F.2.1

DO
EXERCISE

1

This exercise is designed to give you practice making decisions about situations in which you would test for criterion and preparatory outputs.

TURN TO NEXT PAGE FOR PROBLEMS

EXERCISE 1

For each objective below check as many columns (A, B, and/or C) indicating the type(s) of testing information you might be likely to want.

Desirable to Test in Order to Assess for:
A. B. C.

	OBJECTIVES	Proficiency at CRITERION Behavior	INTERIM Progress	DIAGNOSTIC Evidence of Learning Difficulties
1.	Given a statement of objectives for any subject matter or any type of learning, the curriculum development trainee will formulate an instructional strategy.		5	
2.	Instructed to draw the curve for positively and negatively skewed and for normal distributions, the student will correctly draw each type.			
3.	Given a written description of a research problem in the social sciences, the student will categorize it as one of nine possible types of research problems.			
4.	Given the results for items on a multiple choice test, the student will carry out the five steps involved in procedures for conducting an item analysis.			
5.	Given English sentences, the student will identify the subject and the predicate. The teacher plans to cover this material in about an hour.			
6.	Given unpunctuated sentences, the student will edit them using correct capitalization. The teacher plans to spend several weeks on this.			
7.	Given a description of several important changes in American society, the student will identify from a set of alternatives the statement which best describes the commonly accepted probable cause.			
8.	Given an oral presentation of ten words, students will write them producing correct spelling on all ten.			
	Based on one lesson, students will be given examples of music played with varying degrees of tonal quality and be expected to rate them (approximately the ratings made by experts).			
10.	Given a singular or plural personal pronoun, the student will use the correct present tense of the verb "to be" (based on one hour of instruction).			

ANSWERS

EXERCISE 1

For each objective below check as many columns (A, B, and/or C) indicating the type(s) of testing information you might be likely to want.

Desirable to Test in Order to Assess for:

A. B. C.

Proficiency
at CRITERION
Behavior INTERIM
Progress DIAGNOSTIC
Evidence
of Learning
Difficulties

OBJECTIVES	Proficiency at CRITERION Behavior	INTERIM Progress	DIAGNOSTIC Evidence of Learning Difficulties
1. Given a statement of objectives for any subject matter or any type of learning, the curriculum development trainee will formulate an instructional strategy.	X	X	X
2. Instructed to draw the curve for positively and negatively skewed and for normal distributions, the student will correctly draw each type.	X		
3. Given a written description of a research problem in the social sciences, the student will categorize it as one of nine possible types of research problems.	X	X	X
4. Given the results for items on a multiple choice test, the student will carry out the five steps involved in procedures for conducting an item analysis.	X	X	
5. Given English sentences, the student will identify the subject and the predicate. The teacher plans to cover this material in about an hour.	X		
6. Given unpunctuated sentences, the student will edit them using correct capitalization. The teacher plans to spend several weeks on this.	X	X	X
7. Given a description of several important changes in American society, the student will identify from a set of alternatives the statement which best describes the commonly accepted probable cause.	X	X	X
8. Given an oral presentation of ten words, students will write them producing correct spelling on all ten.	X		
9. Based on one lesson, students will be given examples of music played with varying degrees of tonal quality and be expected to rate them (approximately the ratings made by experts).	X		X
10. Given a singular or plural personal pronoun, the student will use the correct present tense of the verb "to be" (based on one hour of instruction).	X		

This exercise is designed to give you practice in determining how much of criterion behavior to sample in tests.

TURN TO NEXT PAGE FOR PROBLEMS

EXERCISE 2

In each problem below there are two statements of objectives. Each describes the number of INPUT classes to be sampled.

Put an X through the objective, A or B, for which you would develop MORE test items PER CLASS.

	Objective A	Objective B
1.	<u>Given:</u> Any example of the five types of nutrient requirements of the body, namely, water, carbohydrates, proteins, fats, vitamins, and minerals <u>Student will:</u> State the functions each performs in the body (RECALL)	<u>Given:</u> Any example of a vitamin or of a mineral <u>Student will:</u> Identify the example as a vitamin or a mineral (RECALL)
2.	<u>Given:</u> Any example of a paragraph using one of six ways to develop a progression of ideas <u>Student will:</u> Identify the technique used and cite specific content used to implement the technique (TRANSFER)	<u>Given:</u> Any example of a paragraph which has the central idea stated either in the first sentence or in a concluding sentence <u>Student will:</u> Identify the topic sentence in each by underlining it (TRANSFER)
3.	<u>Given:</u> Any example of three types of quantitative data: ordinal, interval, or ratio <u>Student will:</u> Name the type (TRANSFER)	<u>Given:</u> Any example of quantitative and qualitative data <u>Student will:</u> Identify the type (TRANSFER)
4.	<u>Given:</u> Any example of any of the five vowels or any example of the twenty-five consonants <u>Student will:</u> Label it as a "vowel" or a "consonant" (RECALL)	<u>Given:</u> Any letter of the alphabet in any of the following forms: script, lower case artisan, upper case artisan, and lower and upper case versions for two other type faces (gothic, italics) <u>Student will:</u> Read the letter correctly (RECALL)
5.	<u>Given:</u> Any example of the four types of component learning skills (discriminations, generalizations, associations, or chains) <u>Student will:</u> Describe the type of instruction he would prepare for it (TRANSFER)	<u>Given:</u> Any example of a learning problem: acquisition vs. retention <u>Student will:</u> Describe the type of instruction he would prepare for it (TRANSFER)

SEE ANSWERS

ANSWERS

EXERCISE 2

In each problem below there are two statements of objectives. Each describes the number of INPUT classes to be sampled.

Put an X through the objective, A or B, for which you would develop MORE test items PER CLASS.

	Objective A	Objective B
1.	<u>Given:</u> Any example of the five types of nutrient requirements of the body, namely, water, carbohydrates, proteins, fats, vitamins, and minerals <u>Student will:</u> State the functions each performs in the body (RECALL)	<u>Given:</u> Any example of a vitamin or of a mineral <u>Student will:</u> Identify the example as a vitamin or a mineral (RECALL)
2.	<u>Given:</u> Any example of a paragraph using one of six ways to develop a progression of ideas <u>Student will:</u> Identify the technique used and cite specific content used to implement the technique (TRANSFER)	<u>Given:</u> Any example of a paragraph which has the central idea stated either in the first sentence or in a concluding sentence <u>Student will:</u> Identify the topic sentence in each by underlining it (TRANSFER)
3.	<u>Given:</u> Any example of three types of quantitative data: ordinal, interval, or ratio <u>Student will:</u> Name the type (TRANSFER)	<u>Given:</u> Any example of quantitative and qualitative data <u>Student will:</u> Identify the type (TRANSFER)
4.	<u>Given:</u> Any example of any of the five vowels or any example of the twenty-five consonants <u>Student will:</u> Label it as a "vowel" or a "consonant" (RECALL)	<u>Given:</u> Any letter of the alphabet in any of the following forms: script, lower case artisan, upper case artisan, and lower and upper case versions for two other type faces (gothic, italics) <u>Student will:</u> Read the letter correctly (RECALL)
5.	<u>Given:</u> Any example of the four types of component learning skills (discriminations, generalizations, associations, or chains) <u>Student will:</u> Describe the type of instruction he would prepare for it (TRANSFER)	<u>Given:</u> Any example of a learning problem: acquisition vs. retention <u>Student will:</u> Describe the type of instruction he would prepare for it (TRANSFER)

END OF EXERCISE

Exercises 3A-3F are designed to give you practice in identifying the required properties of test items and in developing test items which meet these requirements.

TURN TO NEXT PAGE FOR PROBLEMS

EXERCISE 3A

For each of the following test items, put an X in the column indicating the type of response mode required.

TEST ITEMS		Response Mode:		
		RECOGNITION	EDITING	PRODUCTION
1.	Make one sentence out of the following two. Use a conjunction to connect the two sentences. <i>The women worked.</i> <i>The children played.</i>			
2.	If the punctuation is incorrect, correct it. If it is O.K., do nothing. "Mr. Douglas, who has been married three times, arrived on time for the press conference."			
3.	Solve the following problem: $12 \div 3 =$			
4.	Correct the error in this division problem. $\begin{array}{r} 43 \\ 15 \overline{)650} \\ \underline{60} \\ 50 \\ \underline{50} \\ 0 \end{array}$			
5.	Listen to this folk song and tell me if it's Russian, Hungarian, Israeli, or Greek.			
6.	Name two problems that came with the growth of cities.			
7.	Match the following terms: _____ Presto a. Very slow _____ Adagio b. Moderate speed _____ Moderato c. Fast			
8.	Name the food in each of these pictures. (Student is shown pictures of apple, carrot, etc.)			
9.	Is this spelling correct? If yes, do nothing. If no, correct it. <i>Conscience</i>			
10.	Write a report describing the food processing method known as drying, tracing its development from the prehistoric era to the present space age.			

ANSWERS

EXERCISE 3A

For each of the following test items, put an X in the column indicating the type of response mode required.

	TEST ITEMS	Response Mode:		
		RECOGNITION	EDITING	PRODUCTION
1.	Make one sentence out of the following two. Use a conjunction to connect the two sentences. <i>The women worked.</i> <i>The children played.</i>			X
2.	If the punctuation is incorrect, correct it. If it is O.K., do nothing. <i>"Mr. Douglas, who has been married three times, arrived on time for the press conference."</i>		X	
3.	Solve the following problem: $12 : 3 =$			X
4.	Correct the error in this <u>division</u> problem. $\begin{array}{r} 43 \\ 15 \overline{) 650} \\ \underline{60} \\ 50 \\ \underline{50} \end{array}$		X	
5.	Listen to this folk song and tell me if it's Russian, Hungarian, Israeli, or Greek.	X		
6.	Name two problems that came with the growth of cities.			X
7.	Match the following terms: ____ Presto a. Very slow ____ Adagio b. Moderate speed ____ Moderato c. Fast	X		
8.	Name the food in each of these pictures. (Student is shown pictures of apple, carrot, etc.)			X
9.	Is this spelling correct? If yes, do nothing. If no, correct it. <i>Conscience</i>		X	
10.	Write a report describing the food processing method known as drying, tracing its development from the prehistoric era to the present space era.			X

EXERCISE 3B

For each pair of test items below put an X through the one which does a better job of meeting FORMAL requirements for test items.

In Column C, tell why the one you selected is better.

A.	B.	C.
1. Rewrite the following sentence in a new way. <i>A big striped tiger lay at the edge of the jungle.</i>	Rewrite the following sentence in a new way. Add or subtract words if necessary, but do not change the meaning of the sentence. <i>A big striped tiger lay at the edge of the jungle.</i>	
2. Listen to this folk song and tell me if it's Russian or Hungarian.	Listen to this folk song and tell me if it's Russian, Hungarian, Israeli, or Greek.	
3. Round off the following number to the nearest hundredth. 3.627	An accountant must always round off numbers to the nearest hundredth. How would an accountant round off the number 3.627?	
4. An act forbidding any further issue of paper money in the colonies was called: a. The Townshend Act b. The Currency Act c. The Economic Control Act d. The Monetary Act	An act forbidding any further issue of paper money in the colonies was called: a. The Sugar Act b. The Stamp Act c. The Currency Act d. The Civil Rights Act	
5. An Act which levied tax on all colonial imports from the Spanish and French West Indies was called _____.	A tax was levied on all imports from the West Indies by _____.	

SEE ANSWERS

ANSWERS

EXERCISE 3B

For each pair of test items below put an X through the one which does a better job of meeting FORMAL requirements for test items.

In Column C, tell why the one you selected is better.

A.	B.	C.
1. Rewrite the following sentence in a new way. <i>A big striped tiger lay at the edge of the jungle.</i>	~~Rewrite the following sentence in a new way. Add or subtract words if necessary, but do not change the meaning of the sentence. <i>A big striped tiger lay at the edge of the jungle.</i>~~	<i>Clearer, more adequate instructions</i>
2. Listen to this folk song and tell me if it's Russian or Hungarian.	~~Listen to this folk song and tell me if it's Russian, Hungarian, Israeli, or Greek.~~	<i>More options which minimize chance factors in getting answer</i>
3. Round off the following number to the nearest hundredth. 3.627	~~An accountant must always round off numbers to the nearest hundredth. How would an accountant round off the number 3.627?~~	<i>Concise, not wordy</i>
4. An act forbidding any further issue of paper money in the colonies was called: a. The Townsend Act b. The Currency Act c. The Economic Control Act d. The Monetary Act	~~An act forbidding any further issue of paper money in the colonies was called: a. The Sugar Act b. The Stamp Act c. The Currency Act d. The Civil Rights Act~~	<i>Provides plausible options</i>
5. An act which levied tax on all colonial imports from the Spanish and French West Indies was called _____.	~~A tax was levied on all imports from the West Indies by _____.~~	<i>Unambiguous</i>

DO NEXT PROBLEM

EXERCISE 30

For each statement of objectives below two test items have been developed. Put an X through the one whose content better reflects the difficulties in learning and performing the criterion behavior specified in the objective.

Objective	Test Item A	Test Item B																		
1. <i>Given specific travel needs and information, the secretary-trainee will prepare a travel itinerary. It will include: (a) traveler's name, date, and destination; (b) daily on-the-hour schedule; (c) names of airlines, flight numbers, and arrival and departure times; and (d) credit card accepted.</i>	(The test item presents a hypothetical travel specification.) The student must write a travel itinerary which conforms to the criteria in the objective.	What items should be included in a travel itinerary?																		
2. <i>Given a famous historical speech (Lincoln's Gettysburg Address), the student will identify the known facts contained in the speech and separate the facts from inferences.</i>	Read the following speech by Abraham Lincoln. Underline the portions of the speech which present known facts. Double underline the portions of the speech which are inferential.	Read the following speech by Abraham Lincoln. Underline <u>one</u> statement of fact. Double underline <u>one</u> inference contained in the speech.																		
3. <i>Given a map and a choice of descriptions, the student will identify the descriptions which best characterize the map.</i>	Read this map. Then read the four sentences below the map. Put an X in front of the <u>one</u> sentence which is appropriate for the map.	Read this map. Then read the sentences below. Indicate by a true or false answer if the sentence is appropriate for the map.																		
4. <i>Given a specific location and a specific month, the student will name the season that would be in effect that month.</i>	What season of the year would it be in Bogota during June?	Fill in the following chart by identifying the season for each city. <table border="1"> <thead> <tr> <th>City</th><th>Month</th><th>Season</th></tr> </thead> <tbody> <tr> <td>Montevideo</td><td>June</td><td></td></tr> <tr> <td>Miami</td><td>Jan.</td><td></td></tr> <tr> <td>Montreal</td><td>Jan.</td><td></td></tr> <tr> <td>Seattle</td><td>Sept.</td><td></td></tr> <tr> <td>Bogota</td><td>Sept.</td><td></td></tr> </tbody> </table>	City	Month	Season	Montevideo	June		Miami	Jan.		Montreal	Jan.		Seattle	Sept.		Bogota	Sept.	
City	Month	Season																		
Montevideo	June																			
Miami	Jan.																			
Montreal	Jan.																			
Seattle	Sept.																			
Bogota	Sept.																			
5. <i>Given an instance in which man has altered his environment, the student will name the positive and negative effects of the alteration.</i>	A dam is a man-made alteration of the environment. Give one negative effect. Give one positive effect.	The following are man-made alterations in the environment. Provide one positive and one negative effect resulting from each: dam, oil field, freeway, waste system disposal, gravel pit, park.																		

ANSWERS

EXERCISE 3C

For each statement of objectives below two test items have been developed.

Put an X through the one whose content better reflects the difficulties in learning and performing the criterion behavior specified in the objective.

	Objective	Test Item A	Test Item B																		
1.	Given specific travel needs and information, the secretary-trainee will prepare a travel itinerary. It will include: (a) traveler's name, date, and destination; (b) daily on-the-hour schedule; (c) names of airlines, flight numbers, and arrival and departure times; and (d) credit card accepted.	~~(The test item presents a hypothetical travel specification.) The student must write a travel itinerary which conforms to the criteria in the objective.~~	What items should be included in a travel itinerary?																		
2.	Given a famous historical speech (Lincoln's Gettysburg Address), the student will identify the known facts contained in the speech and separate the facts from inferences.	~~Read the following speech by Abraham Lincoln. Underline the portions of the speech which present known facts. Double underline the portions of the speech which are inferential.~~	Read the following speech by Abraham Lincoln. Underline <u>one</u> statement of fact. Double underline <u>one</u> inference contained in the speech.																		
3.	Given a map and a choice of descriptions, the student will identify the descriptions which best characterize the map.	~~Read this map. Then read the four sentences below the map. Put an X in front of the <u>one</u> sentence which is appropriate for the map.~~	Read this map. Then read the sentences below. Indicate by a true or false answer if the sentence is appropriate for the map.																		
4.	Given a specific location and a specific month, the student will name the season that would be in effect that month.	What season of the year would it be in Bogota during June?	Fill in the following chart by identifying the season for each city. <table><tr><th>City</th><th>Month</th><th>Season</th></tr><tr><td>Montevideo</td><td>June</td><td></td></tr><tr><td>Miami</td><td>Jan.</td><td></td></tr><tr><td>Montreal</td><td>Jan.</td><td></td></tr><tr><td>Seattle</td><td>Sept.</td><td></td></tr><tr><td>Bogota</td><td>Sept.</td><td></td></tr></table>	City	Month	Season	Montevideo	June		Miami	Jan.		Montreal	Jan.		Seattle	Sept.		Bogota	Sept.	
City	Month	Season																			
Montevideo	June																				
Miami	Jan.																				
Montreal	Jan.																				
Seattle	Sept.																				
Bogota	Sept.																				
5.	Given an instance in which man has altered his environment, the student will name the positive and negative effects of the alteration.	A dam is a man-made alteration of the environment. Give one negative effect. Give one positive effect.	~~The following are man-made alterations in the environment. Provide one positive and one negative effect resulting from each: dam, oil field, freeway, waste system disposal, gravel pit, park.~~																		

EXERCISE 3D

For each test goal below, two types of scoring are described. Put an X through the type of scoring which is likely to be done more objectively.

	TEST GOAL	SCORING METHOD	
		A.	B.
1.	Student must identify a major theme in <u>Jane Eyre</u> .	Scorer checks to see whether the correct answer in a multiple choice item is endorsed.	Scorer checks to see whether ideas involved in major theme are present in an essay written by student.
2.	Student must correctly punctuate an unpunctuated paragraph given him.	Scorer rates student on scale of 1-5 for use of each type of punctuation: periods, commas, and semi-colons.	Scorer works from a correctly punctuated paragraph and compares student's paragraph with it; counts number of correspondences.
3.	Student must compare and contrast "monetary" and "fiscal" policy.	Scorer assigns from 1-10 points to the student's essay answer depending on his estimate of adequacy of examples provided by student.	Scorer has a list of properties the student must mention for each concept and adds up the number mentioned by the student.
4.	Student must do "school figures" in figure skating competition.	Pattern skater must execute is marked on ice. Judges assess degree of adherence by student to pattern.	Judges, based on their prior experience, assess the adequacy of each pattern executed.
5.	Student mechanic must set spark plug gap to correct width.	Scorer visually inspects gap and accepts or rejects.	Scorer passes instrument through gap and checks for snugness of fit. Accepts or rejects.

SEE ANSWERS

ANSWERS

EXERCISE 3D

For each test goal below, two types of scoring are described. Put an X through the type of scoring which is likely to be done more objectively.

	TEST GOAL	SCORING METHOD	
		A.	B.
1.	Student must identify a major theme in <u>Jane Eyre</u> .	~~Scorer checks to see whether the correct answer in a multiple choice item is endorsed.~~	Scorer checks to see whether ideas involved in major theme are present in an essay written by student.
2.	Student must correctly punctuate an unpunctuated paragraph given him.	Scorer rates student on scale of 1-5 for use of each type of punctuation: periods, commas, and semi-colons.	~~Scorer works from a correctly punctuated paragraph and compares student's paragraph with it; counts number of correspondences.~~
3.	Student must compare and contrast "monetary" and "fiscal" policy.	Scorer assigns from 1-10 points to the student's essay answer depending on his estimate of adequacy of examples provided by student.	~~Scorer has a list of properties the student must mention for each concept and adds up the number mentioned by the student.~~
4.	Student must do "school figures" in figure skating competition.	~~Pattern skater must execute is marked on ice. Judges assess degree of adherence by student to pattern.~~	Judges, based on their prior experience, assess the adequacy of each pattern executed.
5.	Student mechanic must set spark plug gap to correct width.	Scorer visually inspects gap and accepts or rejects.	~~Scorer passes instrument through gap and checks for snugness of fit. Accepts or rejects.~~

DO NEXT PROBLEM

EXERCISE 3E

Your task in the problems appearing on the next page is to improve the objectivity of the scoring.

A list of possible ways to improve objectivity is provided below. Read it and then do the problems on the next page.

-Produce a standard for comparison	-Create a permanent record of the output
-Identify properties of a standard output	-Evaluate for the presence or absence of elements
-Develop criteria which must be met	-Provide bench markers for degrees (in rating)
	-Identify a behavioral objective

TURN TO NEXT PAGE FOR PROBLEMS

EXERCISE 3E

1. A coach has to rate the performance of five gymnasts. The coach plans to have them each perform exactly the same maneuvers. He also plans to observe each one in turn and then select the best one.

What else could the coach do to make the rating more objective?

2. A teacher is devising an item to test students' use of topic sentences in paragraphs. She plans to have them write a paragraph about their favorite food and to underline the topic sentence in order to see whether it occurs at the beginning or end of the paragraph.

What can she do in addition to make her scoring of the adequacy of the relationship between the topic sentence and other sentences more objective?

3. Students in a woodworking class are being evaluated for the course on a small bookshelf they each made during the course. The instructor has developed a list of criteria to judge the students' outputs, all of which were made from the same plans.

What else can the instructor do to make scoring more objective?

SEE ANSWERS

ANSWERS

EXERCISE 3E

1. A coach has to rate the performance of five gymnasts. The coach plans to have them each perform exactly the same maneuvers. He also plans to observe each one in turn and then select the best one.

What else could the coach do to make the rating more objective?

(1) Create a film of each gymnast's performance as a permanent record which the coach could look at again and again to contrast and compare performances; (2) develop a checklist of standards by which each gymnast could be rated as he performed.

2. A teacher is devising an item to test students' use of topic sentences in paragraphs. She plans to have them write a paragraph about their favorite food and to underline the topic sentence in order to see whether it occurs at the beginning or end of the paragraph.

What can she do in addition to make her scoring of the adequacy of the relationship between the topic sentence and other sentences more objective?

Develop a set of categories of types of sentences which should either follow or precede topic sentences; and check for presence or absence of these types.

3. Student in a woodworking class are being evaluated for the course on a small bookshelf they each made during the course. The instructor has developed a list of criteria to judge the students' outputs, all of which were made from the same plans.

What else can the instructor do to make scoring more objective?

Produce "standard" measurements and then measure the bookshelves produced, and identify how close to standard each student is.

DO NEXT PROBLEM

These pages were

~~THIS PAGE WAS~~ MISSING FROM THE DOCUMENT THAT WAS
SUBMITTED TO ERIC DOCUMENT REPRODUCTION SERVICE.

F-23, F-24

ANSWERS

Form F-2(1)

Test Item #1 Answer

LESSON

OBJECTIVE

FORM FOR TEST DEVELOPMENT

"GIVEN"	INFORMATION YOU PLAN TO GIVE TO STUDENT
- Instructions - Question or Problem ..INPUTS (new/old) ..AIDS (when applicable)	a. To what food group does ice cream belong? b. What is the main nutritive contribution made by this food?
..ANSWER OPTIONS (when applicable)	

"STUDENT WILL"	WHAT THE STUDENT IS EXPECTED TO DO
- ACTIONS (new/old) ..mode	In writing states "milk and dairy" and "calcium and riboflavin."

"RESULTING IN"	WHAT THE STUDENT IS EXPECTED TO TURN OUT
- OUTPUT ..answers ..product - Type of Scoring - Standards for Scoring	-Answers as above -Right/wrong standard for food category and for the two nutrients

LESSON

OBJECTIVE

2

FORM FOR TEST DEVELOPMENT

"GIVEN"	INFORMATION YOU PLAN TO GIVE TO STUDENT
— Instructions — Question or Problem •• INPUTS (new/old) •• AIDS (when applicable)	
•• ANSWER OPTIONS (when applicable)	

"STUDENT WILL"	WHAT THE STUDENT IS EXPECTED TO DO
— ACTIONS (new/old) •• mode	

"RESULTING IN"	WHAT THE STUDENT IS EXPECTED TO TURN OUT
— OUTPUT •• answers •• product — Type of Scoring — Standards for Scoring	

ANSWERS

Test Item #2 Answer

LESSON

OBJECTIVE

2

FORM FOR TEST DEVELOPMENT

"GIVEN"	INFORMATION YOU PLAN TO GIVE TO STUDENT										
— Instructions — Question or Problem •• INPUTS (new/old) •• AIDS (when applicable)	<i>Find the quotient for the following ten problems:</i> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">$33 \div 14 =$</td> <td style="width: 50%;">$36 \div 12 =$</td> </tr> <tr> <td>$67 \div 55 =$</td> <td>$49 \div 13 =$</td> </tr> <tr> <td>$52 \div 24 =$</td> <td>$23 \div 13 =$</td> </tr> <tr> <td>$93 \div 26 =$</td> <td>$98 \div 44 =$</td> </tr> <tr> <td>$29 \div 19 =$</td> <td>$25 \div 11 =$</td> </tr> </table>	$33 \div 14 =$	$36 \div 12 =$	$67 \div 55 =$	$49 \div 13 =$	$52 \div 24 =$	$23 \div 13 =$	$93 \div 26 =$	$98 \div 44 =$	$29 \div 19 =$	$25 \div 11 =$
$33 \div 14 =$	$36 \div 12 =$										
$67 \div 55 =$	$49 \div 13 =$										
$52 \div 24 =$	$23 \div 13 =$										
$93 \div 26 =$	$98 \div 44 =$										
$29 \div 19 =$	$25 \div 11 =$										
•• ANSWER OPTIONS (when applicable)											

"STUDENT WILL"	WHAT THE STUDENT IS EXPECTED TO DO
— ACTIONS (new/old) •• mode	<i>Produce the correct answer to each problem.</i>

"RESULTING IN"	WHAT THE STUDENT IS EXPECTED TO TURN OUT
— OUTPUT •• answers •• product — Type of Scoring — Standards for Scoring	<i>-Ten correct quotients (to one decimal place)</i> <i>-Odd numbers raised one to round off; even numbers untouched)</i> <i>-Answers are right or wrong (no partial credit)</i>

LESSON

OBJECTIVE

3

FORM FOR TEST DEVELOPMENT

"GIVEN"	INFORMATION YOU PLAN TO GIVE TO STUDENT
- Instructions - Question or Problem ..INPUTS (new/old) ..AIDS (when applicable)	
..ANSWER OPTIONS (when applicable)	

"STUDENT WILL"	WHAT THE STUDENT IS EXPECTED TO DO
- ACTIONS (new/old) ..mode	

"RESULTING IN"	WHAT THE STUDENT IS EXPECTED TO TURN OUT
- OUTPUT ..answers ..product - Type of Scoring - Standards for Scoring	

ANSWERS

Test Item #3 Answer

LESSON

OBJECTIVE

3

FORM FOR TEST DEVELOPMENT

"GIVEN"	INFORMATION YOU PLAN TO GIVE TO STUDENT
- Instructions - Question or Problem ••INPUTS (new/old) ••AIDS (when applicable)	<i>Draw a three-view, front, top, and end, orthographic projection of this object.</i> <i>Present object with a cylindrical part.</i>
••ANSWER OPTIONS (when applicable)	

"STUDENT WILL"	WHAT THE STUDENT IS EXPECTED TO DO
- ACTIONS (new/old) ••mode	<i>Draw front, top, and side view of object</i>

"RESULTING IN"	WHAT THE STUDENT IS EXPECTED TO TURN OUT
- OUTPUT ••answers ••product - Type of Scoring - Standards for Scoring	<i>Correct orthographic projection of cylindrical part.</i>

FOLD BACK PAGE F-24

After reading
Handbook for
sub-STEP(S)

F.2.4-F.3.1

DO
EXERCISE

4

Exercises 4A-4B are designed to give you practice in identifying error patterns on tests.

TURN TO NEXT PAGE FOR PROBLEMS

EXERCISE 4A

For the general error patterns described below, put an X in the column for the most likely type of learning failure indicated by them.

	Description of Error Pattern	FAILURE IN:		
		Discrimi- nation	General- ization	Association
1.	Shown pictures of two types of land forms, mountains and hills, a student labels both as "mountains."			
2.	On a recall test item a student correctly labels a panda as a carnivorous mammal. He incorrectly labels a carnivorous skunk (a transfer item) as herbivorous.			
3.	A student incorrectly labels one type of parallel circuit diagram as a "series parallel" circuit while correctly labeling other parallel circuit diagrams.			
4.	Student labels all "parallel" circuit and "series parallel" circuit diagrams as being parallel.			
5.	Incorrectly says that Stan Laurel is the "fat one," and Oliver Hardy is the "skinny one."			

ANSWERS

EXERCISE 4A

For the general error patterns described below, put an X in the column for the most likely type of learning failure indicated by them.

	Description of Error Pattern	FAILURE IN:		
		Discrimi- nation	General- ization	Association
1.	Shown pictures of two types of land forms, mountains and hills, a student labels both as "mountains."	X		
2.	On a recall test item a student correctly labels a panda as a carnivorous mammal. He incorrectly labels a carnivorous skunk (a transfer item) as herbivorous.		X	
3.	A student incorrectly labels one type of parallel circuit diagram as a "series parallel" circuit while correctly labeling other parallel circuit diagrams.		X	
4.	Student labels all "parallel" circuit and "series parallel" circuit diagrams as being parallel.	X		
5.	Incorrectly says that Stan Laurel is the "fat one," and Oliver Hardy is the "skinny one."			X

EXERCISE 4B

For the general error patterns described below, put an X in the column for the most likely type of learning failure indicated by them.

Description of Error Patterns		FAILURE IN:	
		General-ization	Chaining
1.	A secretary is placing a call on "hold." She incorrectly hangs up the phone before depressing the hold button, and a disconnect results.		
2.	Given a scrambled list in the dishwashing process, the student is asked to number these steps in the most efficient order. Several steps are numbered incorrectly.		
3.	To meet dietary needs, a student can use fresh, canned, frozen, or dried vegetables. On several test items asking for variation in meeting dietary needs, she always recommends fresh vegetables.		
4.	Student adding and subtracting fractions omits reducing answer to its simplest form.		
5.	Mechanical drawing student can use a compass or a template to draw a circle. On a drawing test a student incorrectly attempts to draw a circle with the aid of a "French curve."		

ANSWERS

EXERCISE 4B

For the general error patterns described below, put an X in the column for the most likely type of learning failure indicated by them.

		FAILURE IN:	
Description of Error Patterns		General-ization	Chaining
1.	A secretary is placing a call on "hold." She incorrectly hangs up the phone before depressing the hold button, and a disconnect results.		X
2.	Given a scrambled list in the dishwashing process, the student is asked to number these steps in the most efficient order. Several steps are numbered incorrectly.		X
3.	To meet dietary needs, a student can use fresh, canned, frozen, or dried vegetables. On several test items asking for variation in meeting dietary needs, she always recommends fresh vegetables.	X	
4.	Student adding and subtracting fractions omits reducing answer to its simplest form.		X
5.	Mechanical drawing student can use a compass or a template to draw a circle. On a drawing test a student incorrectly attempts to draw a circle with the aid of a "French curve."	X	

After reading
Handbook for
sub-STEP(S)

F.3.2

DO
EXERCISE

5

This exercise is designed to give you practice in developing probes you might use following up student errors on test items.

TURN TO NEXT PAGE FOR PROBLEMS

EXERCISE 5

For each situation below assume that student replies to your initial probes do not provide a clue as to what has gone wrong.

Develop two types of probes you might use to follow up the first probe. Record them in the order in which you would use them (i.e., 2-3).

	1	2	3
What Student Does			
1. Incorrectly classifies levers. (<i>Classification depends on where fulcrum, load, and effort applied are.</i>)	Why did you call this a Type II lever?		
2. Omits commas or incorrectly uses commas in paragraph with restrictive and non-restrictive clauses.	Why did you put commas here? Why did you leave a comma out here?		
3. Uses the wrong average (mean, median, mode). (Correct use depends on distribution, use of the statistic.)	Why did you choose the mode here, rather than the mean or median?		
4. With the words "pairs," "series," or "group of" as subjects, uses incorrect present tense of verb.	Why did you say "are"?		
5. Wrongly identifies the artist who did paintings. (Identification based on colors, brush strokes, etc.)	Why did you call these "Matisse's"?		

SEE ANSWERS

ANSWERS

EXERCISE 5

For each situation below assume that student replies to your initial probes do not provide a clue as to what has gone wrong.

Develop two types of probes you might use to follow up the first probe. Record them in the order in which you would use them (i.e., 2-3).

What Student Does

1. Incorrectly classifies levers. (*Classification depends on where fulcrum, load, and effort applied are.*)

2. Omits commas or incorrectly uses commas in paragraph with restrictive and non-restrictive clauses.

3. Uses the wrong average (mean, median, mode). (Correct use depends on distribution, use of the statistic.)

4. With the words "pairs," "series," or "group of" as subjects, uses incorrect present tense of verb

5. Wrongly identifies the artist who did paintings. (Identification based on colors, brush strokes, etc.)

Why did you call this a Type II lever?

Why did you put commas here? Why did you leave a comma out here?

Why did you choose the mode here, rather than the mean or median?

Why did you say "are"?

Why did you call these "Matisse's"?

Tell me what characteristics of this lever made you call it Type II?

In what way would the clause have to be different for you to use/not use a comma?

What was there about the statistical problem that made you choose the mode?

What kind of word is "series" that made you say "are"?

What features of these paintings made you say "Matisse"?

Look at the position of the fulcrum, load, and effort force. Is there anything there that made you say Type II?

Does the presence of this clause restrict the meaning of the sentence?

Was there something about the distribution of scores that made you choose the mode?

Is "series" singular or plural?

If you had ignored "color," would you still have said "Matisse"?

PROBES

2

3

END OF EXERCISE

After reading
Handbook for
sub-STEP(S)

F.3.3

DO
EXERCISE

6

This exercise is designed to give you practice in developing diagnostic test items.

TURN TO NEXT PAGE FOR PROBLEMS

F-40 / F-41

EXERCISE 6

For each situation below, develop a diagnostic test item which will help you to identify the nature of the learning failure that has occurred.

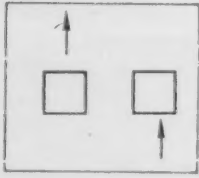
SITUATION	DIAGNOSTIC TEST ITEMS
PHONICS 1. Student produces incorrect sound for letters. <i>Has he failed to <u>discriminate</u> between letters?</i>	
ENGLISH 2. Student incorrectly labels clause as "restrictive" or "non-restrictive." <i>Has he failed to <u>generalize</u> across the same types of clauses?</i>	
PHYSICS 3. Student identifies <u>direction</u> of forces (indicated by arrows) incorrectly. <i>Has he failed to <u>generalize</u> across pushing and pulling forces?</i>	
PHYSICS 4. Student incorrectly classifies type of lever. <i>Has he failed to <u>discriminate</u> among types?</i>	
ENGLISH 5. Student uses incorrect form of verb "to be" with personal pronouns. <i>Has he failed to <u>associate</u> the proper form of the verb with subjects?</i>	

SEE ANSWERS

ANSWERS

EXERCISE 6

For each situation below, develop a diagnostic test item which will help you to identify the nature of the learning failure that has occurred.

SITUATION	DIAGNOSTIC TEST ITEMS
PHONICS 1. Student produces incorrect sound for letters. <i>Has he failed to <u>discriminate</u> between letters?</i>	Present a "b" and a "d" and ask: "Are these supposed to be pronounced in the same or in a different way?"
ENGLISH 2. Student incorrectly labels clause as "restrictive" or "non-restrictive." <i>Has he failed to <u>generalize</u> across the same types of clauses?</i>	Are these clauses of the same type? "A man (who has a beard) arrived on time." "A man (who has a beard) met the train."
PHYSICS 3. Student identifies direction of forces (indicated by arrows) incorrectly. <i>Has he failed to <u>generalize</u> across pushing and pulling forces?</i>	 Is the direction of the two forces the same or different?
PHYSICS 4. Student incorrectly classifies type of lever. <i>Has he failed to <u>discriminate</u> among types?</i>	 Do these levers belong to the same class?
ENGLISH 5. Student uses incorrect form of verb "to be" with personal pronouns. <i>Has he failed to <u>associate</u> the proper form of the verb with subjects?</i>	Which is correct? "He don't." "He doesn't."

END OF EXERCISE

NOW DO FINAL EXERCISE

#4

WHICH APPEARS IN THE
FINAL EXERCISES VOLUME

FOLD BACK THE BLUE PAGE

F-44 / F-45

FOLD OUT THIS PAGE AND
FOLLOW THE "E" SCHEDULE INSIDE

EXERCISES FOR TASK E

	After Reading HANDBOOK Sections	On HANDBOOK Pages	Do WORKBOOK Exercises	On WORKBOOK Pages	Type of Practice
1.	E.1.1 - E.1.2	1 - 27	1A - 1C	E1 - E7	Assessing simulation
2.	E.1.3	29 - 33	2	E9 - E11	Assessing seriousness using criterion behavior in practice
3.	E.2.1	35 - 47	3	E13 - E17	Identifying what proper to simulate
4.	E.2.2	49 - 63	4A - 4C	E19 - E25	Selecting or devising simulation
5.	E.2.3	65 - 75	5A - 5B	E27 - E31	Making final simulation decision
6.	E.2.1 - E.2.3	35 - 75	6	E33 - E35	Using simulation for

7. **WHEN YOU HAVE COMPLETED ALL THE EXERCISES IN THIS SECTION OF THE WORKBOOK, PROCEED TO FINAL EXERCISE #5 IN THE FINAL EXERCISES VOLUME.*

After reading
Handbook for
sub-STEP(S)

E.1.1-E.1.2

DO
EXERCISE

1

Exercises 1A, 1B, and 1C are designed to give you practice in assessing simulation needs based on logistical and instructional factors.

TURN TO NEXT PAGE FOR PROBLEMS

EXERCISE 1A

Identify the types of logistical problems of most concern if criterion behaviors were to be used in each of the instructional situations described below.

Check as many columns as are appropriate.

	CONDITIONS	DOWNTIME	COST	DANGER/DAMAGE
1.	A beginning surgical intern practices open-heart surgery on actual patient			
2.	Electronic repair student practices troubleshooting circuits in a large electronic computer used for CAI purposes			
3.	Apprentice upholsterer practices installing padding before furniture proceeds to next department			
4.	Student driver practices using gear shift, brakes, steering in actual auto on streets or highway			
5.	Student driver who already knows mechanics of operating a car practices driving in traffic on actual street or highway			
6.	Apprentice fireman practices combatting different types of fires using fire trucks required to be available for emergencies			
7.	Apprentice restorer of old paintings practices cleaning techniques on a 16th century original			
8.	Apprentice gift wrapper in department store practices wrapping gifts while customers wait			
9.	Apprentice watchmaker practices setting width of mainspring to be used in assembly of watches			
10.	(Beginning) Student X-ray technician practices taking X-rays with actual patients, actual film, and actual equipment			

ANSWERS

EXERCISE 1A

Identify the types of logistical problems of most concern if criterion behaviors were to be used in each of the instructional situations described below.

Check as many columns as are appropriate.

	CONDITIONS	DOWNTIME	COST	DANGER/DAMAGE
1.	A beginning surgical intern practices open-heart surgery on actual patient			X
2.	Electronic repair student practices troubleshooting circuits in a large electronic computer used for CAI purposes	X	X	X
3.	Apprentice upholsterer practices installing padding before furniture proceeds to next department	X		
4.	Student driver practices using gear shift, brakes, steering in actual auto on streets or highway			X
5.	Student driver who already knows mechanics of operating a car practices driving in traffic on actual street or highway			X
6.	Apprentice fireman practices combatting different types of fires using fire trucks required to be available for emergencies	X	X	X
7.	Apprentice restorer of old paintings practices cleaning techniques on a 16th century original			X
8.	Apprentice gift wrapper in department store practices wrapping gifts while customers wait			X
9.	Apprentice watchmaker practices setting width of mainspring to be used in assembly of watches		X	
10.	(Beginning) Student X-ray technician practices taking X-rays with actual patients, actual film, and actual equipment			X

EXERCISE 1B

Identify the type of instructional problems of most concern if criterion behaviors were used in each of the instructional situations described below.

Check as many columns as are appropriate.

	CONDITIONS	SAMPLING	STANDARD- IZATION	MANIPULATION
1.	A beginning surgical intern practices open-heart surgery on actual patient			
2.	Electronic repair student practices troubleshooting circuits in a large electronic computer used for CAI purposes			
3.	Apprentice upholsterer practices installing padding before furniture proceeds to next department			
4.	Student driver practices using gear shift, brakes, steering in actual auto on streets or highway			
5.	Student driver who already knows mechanics of operating a car practices driving in traffic on actual street or highway			
6.	Apprentice fireman practices combatting different types of fires using fire trucks required to be available for emergencies			
7.	Apprentice restorer of old paintings practices cleaning techniques on a 16th century original			
8.	Apprentice gift wrapper in department store practices wrapping gifts while customers wait			
9.	Apprentice watchmaker practices setting width of mainspring to be used in assembly of watches			
10.	(Beginning) Student X-ray technician practices taking X-rays with actual patients, actual film, and actual equipment			

ANSWERS

EXERCISE 1B

Identify the type of instructional problems of most concern if criterion behaviors were used in each of the instructional situations described below.

Check as many columns as are appropriate.

	CONDITIONS	SAMPLING	STANDARD- IZATION	MANIPULATION
1.	A beginning surgical intern practices open-heart surgery on actual patient	X		X
2.	Electronic repair student practices troubleshooting circuits in a large electronic computer used for CAI purposes	X	X	X
3.	Apprentice upholsterer practices installing padding before furniture proceeds to next department			X
4.	Student driver practices using gear shift, brakes, steering in actual auto on streets or highway			X
5.	Student driver who already knows mechanics of operating a car practices driving in traffic on actual street or highway	X	X	X
6.	Apprentice fireman practices combatting different types of fires using fire trucks required to be available for emergencies	X	X	X
7.	Apprentice restorer of old paintings practices cleaning techniques on a 16th century original	X		X
8.	Apprentice gift wrapper in department store practices wrapping gifts while customers wait	X	X	X
9.	Apprentice watchmaker practices setting width of mainspring to be used in assembly of watches			X
10.	(Beginning) Student X-ray technician practices taking X-rays with actual patients, actual film, and actual equipment			X

EXERCISE 1C

The decision has been made to include the criterion behaviors below in instruction.

For each of the six listed criteria rate the degree of seriousness posed by the decision.

S = Serious; A = Average; N = Negligible

	Criterion Behaviors Used in Training	DOWN- TIME	COST	DANGER/ DAMAGE	SAMPL- ING	STANDARD- IZATION	MANIPU- LATION
1.	Dental student practices identifying types of cavities and filling them in on live patient					✓	
2.	Apprentice boat handler practices docking boat in heavily trafficked docking area						
3.	Student teacher practices identifying problem behavior children and referring those who need professional help						
4.	Highway patrolman practices spotting and ticketing speeding or safety violations						
5.	Audiovisual specialist practices operating one of two overhead projectors in a school for the deaf (that makes extensive use of visuals)						

SEE ANSWERS

ANSWERS

EXERCISE 1C

The decision has been made to include the criterion behaviors below in instruction.

For each of the six listed criteria rate the degree of seriousness posed by the decision.

S = Serious; A = Average; N = Negligible

	Criterion Behaviors Used in Training	DOWN- TIME	COST	DANGER/ DAMAGE	SAMPL- ING	STANDARD- IZATION	MANIPU- LATION
1.	Dental student practices identifying types of cavities and filling them in on live patient	N	A	S	S	S	S
2.	Apprentice boat handler practices docking boat in heavily trafficked docking area	A	N	S	N	N	A
3.	Student teacher practices identifying problem behavior children and referring those who need professional help	N	N	S	S	S	S
4.	Highway patrolman practices spotting and ticketing speeding or safety violations	N	A	A	A	A	A
5.	Audiovisual specialist practices operating one of two overhead projectors in a school for the deaf (that makes extensive use of visuals)	A	N	N	N	N	N

END OF EXERCISE

After reading
Handbook for
sub STEP(S)

E.1.3

DO
EXERCISE

2

This exercise is designed to give you practice in deciding whether or not to simulate based on an assessment of the degree of seriousness of using criterion behavior during instruction.

TURN TO NEXT PAGE FOR PROBLEMS

EXERCISE 2

Below are the ratings of seriousness of using criterion behavior.

For each situation write in your yes or no decision about simulation.

	Criterion Behaviors Used in Training	DOWN- TIME	COST	DANGER/ DAMAGE	SAMPL- ING	STANDARD- IZATION	MANIPU- LATION
1.	Dental student practices identifying types of cavities and filling them in on live patient ____yes ____no	N	A	S	S	S	S
2.	Apprentice boat handler practices docking boat in heavily trafficked docking area ____yes ____no	A	N	S	N	N	A
3.	Student teacher practices identifying problem behavior children and referring those who need professional help ____yes ____no	N	N	S	S	S	S
4.	Highway patrolman practices spotting and ticketing speeding or safety violations ____yes ____no	N	A	A	A	A	A
5.	Audiovisual specialist practices operating one of two overhead projectors in a school for the deaf (that makes extensive use of visuals) ____yes ____no	A	N	N	N	N	N

SEE ANSWERS

ANSWERS

EXERCISE 2

Below are the ratings of seriousness of using criterion behavior.

For each situation write in your yes or no decision about simulation.

	Criterion Behaviors Used in Training	DOWN- T.ME	COST	DANGER/ DAMAGE	SAMPL- ING	STANDARD- IZATION	MANIPU- LATION
1.	Dental student practices identifying types of cavities and filling them in on live patient <u> X </u> yes <u> </u> no	N	A	S	S	S	S
2.	Apprentice boat handler practices docking boat in heavily trafficked docking area <u> </u> yes <u> X </u> no	A	N	S	N	N	A
3.	Student teacher practices identifying problem behavior children and referring those who need professional help <u> X </u> yes <u> </u> no	N	N	S	S	S	S
4.	Highway patrolman practices spotting and ticketing speeding or safety violations <u> X </u> yes <u> </u> no	N	A	A	A	A	A
5.	Audiovisual specialist practices operating one of two overhead projectors in a school for the deaf (that makes extensive use of visuals) <u> </u> yes <u> X </u> no	A	N	N	N	N	N

END OF EXERCISE

After reading
Handbook for
sub-STEP(S)

E.2.1

DO
EXERCISE

3

This exercise is designed to give you practice in identifying the properties of INPUTS, ACTIONS, or OUTPUTS it is desirable to simulate when deciding on what type of simulation to use.

TURN TO NEXT PAGE FOR PROBLEMS

EXERCISE 3

For each problem below, put an X through the one property of the criterion behavior you would most want to simulate.

	LEARNING PROBLEM	MOST IMPORTANT PROPERTY TO SIMULATE		
		#1	#2	#3
1.	A teacher has to be able to identify the type of problem behavior a student is exhibiting in order to be able to apply an appropriate management technique. <i>Property of INPUTS to simulate:</i>	Duration of hyper-activity exhibited	Location in classroom of hyperactive behavior	Gender of student exhibiting hyperactive behavior
2.	Dental student has to determine extent of drilling to do based on condition of a cavity. <i>Property of INPUTS to simulate:</i>	Type of tooth involved	Patient report of degree of pain	Resistance to drilling
3.	Physics student has to make discriminations appropriate to learning principles involved in Archimedes' Law. <i>Property of INPUTS to simulate:</i>	Color of floating object	Magnitude of a buoyant force	Size of a scale face showing apparent weight loss
4.	Student driver learning to pass cars on a highway. <i>Property of INPUTS to simulate:</i>	Width of lanes	Distance in back of car ahead	Horsepower of car ahead
5.	Student airplane pilot learning to land a plane has to make discriminations about conditions. <i>Property of INPUTS to simulate:</i>	Degree of incline of plane	Dryness or wetness of landing strip	Composition of landing strip
6.	Student learning to develop instructional materials. <i>Property of ACTIONS to simulate:</i>	Feeding information to computer	Administer a program for tryout purposes	Producing a film
7.	Teacher using reinforcement principles to manage classroom behavior. <i>Property of ACTIONS to simulate:</i>	Withholding attention (which is reinforcing)	Asking a child what is wrong	Asking a child to stop moving about
8.	Student driver learning to pass cars on a highway. <i>Property of ACTIONS to simulate:</i>	Checking rear view mirror for cars in left lane	Accelerating and decelerating	Braking car
9.	Student draftsman has to decide whether drawings he has produced meet requirements. <i>Property of OUTPUTS to simulate:</i>	Neatness of drawings	Drawings are done to scale	Color of ink used
10.	Student driver learning to parallel park. <i>Property of OUTPUTS to simulate:</i>	Closeness to curb after car is parked	Closeness to car in front after car is parked	Closeness to car in back after car is parked

ANSWERS

EXERCISE 3

For each problem below, put an X through the one property of the criterion behavior you would most want to simulate.

LEARNING PROBLEM	#1	#2	#3
1. A teacher has to be able to identify the type of problem behavior a student is exhibiting in order to be able to apply an appropriate management technique. <i>Property of INPUTS to simulate:</i>	~~Duration of hyper-activity exhibited~~	Location in classroom of hyperactive behavior	~~Gender of student exhibiting hyperactive behavior~~
2. Dental student has to determine extent of drilling to do based on condition of a cavity. <i>Property of INPUTS to simulate:</i>	Type of tooth involved	Patient report of degree of pain	~~Resistance to drilling~~
3. Physics student has to make discriminations appropriate to learning principles involved in Archimedes' Law. <i>Property of INPUTS to simulate:</i>	Color of floating object	~~Magnitude of a buoyant force~~	Size of a scale face showing apparent weight loss
4. Student driver learning to pass cars on a highway. <i>Property of INPUTS to simulate:</i>	Width of lanes	~~Distance in back of car ahead~~	Horsepower of car ahead
5. Student airplane pilot learning to land a plane has to make discriminations about conditions. <i>Property of INPUTS to simulate:</i>	~~Degree of incline of plane~~	Dryness or wetness of landing strip	Composition of landing strip
6. Student learning to develop instructional materials. <i>Property of ACTIONS to simulate:</i>	Feeding information to computer	~~Administer a program for tryout purposes~~	Producing a film
7. Teacher using reinforcement principles to manage classroom behavior. <i>Property of ACTIONS to simulate:</i>	~~Withholding attention (which is reinforcing)~~	Asking a child what is wrong	Asking a child to stop moving about
8. Student driver learning to pass cars on a highway. <i>Property of ACTIONS to simulate:</i>	~~Checking rear view mirror for cars in left lane~~	Accelerating and decelerating	Braking car
9. Student draftsman has to decide whether drawings he has produced meet requirements. <i>Property of OUTPUTS to simulate:</i>	Neatness of drawings	~~Drawings are done to scale~~	Color of ink used
10. Student driver learning to parallel park. <i>Property of OUTPUTS to simulate:</i>	~~Closeness to curb after car is parked~~	Closeness to car in front after car is parked	Closeness to car in back after car is parked

EXERCISE 3A

Your task in this exercise is to identify the properties of INPUTS, ACTIONS, or OUTPUTS you would wish to simulate.

LEARNING PROBLEM	INPUT Properties To Be Simulated	ACTION Properties To Be Simulated	OUTPUT Properties To Be Simulated
1. Nursing student has to position patient for X-ray, take X-ray, and determine adequacy of picture			
2. Pilot trainee has to land plane on deck of aircraft carrier			
3. Student has to relate molecular motion and heat			
4. Comprehend spoken French and reply in French			
5. Salesmen dealing with customers courteously			

SEE ANSWERS

ANSWERS

EXERCISE 3A

Your task in this exercise is to identify the properties of INPUTS, ACTIONS, or OUTPUTS you would wish to simulate.

LEARNING PROBLEM	INPUT Properties To Be Simulated	ACTION Properties To Be Simulated	OUTPUT Properties To Be Simulated
1. Nursing student has to position patient for X-ray, take X-ray, and determine adequacy of picture	Position of patient for particular type of X-ray	Manipulating patient's body and instructing him about position	Adequate delineation of part to be X-rayed
2. Pilot trainee has to land plane on deck of aircraft carrier	Height above carrier, distance from carrier, alignment with carrier deck, air speed, wind speed, etc.	Decisions about air speed, correction of height, alignment, and operations to carry these out	Changes in INPUT condition listed
3. Student has to relate molecular motion and heat	Speed of movement of molecules; height of mercury in thermometer	Going on verbal description of the relationship	Verbal description
4. Comprehend spoken French and reply in French	Audio presentation of French; pronunciation; speed of speech; etc.	Response is oral	Oral OUTPUT: pronunciation, intonation, rhythm, etc.
5. Salesmen dealing with customers courteously	Variations in customer moods (angry, pleasant, etc.)	Make oral response	Response to customers in appropriate tone

END OF EXERCISE

After reading
Handbook for
sub STEP(S)

E.2.2

DO
EXERCISE

4

Exercises 4A-4C are designed to give you practice in selecting or devising simulation.

TURN TO NEXT PAGE FOR PROBLEMS

EXERCISE 4A

Put an X through the simulated INPUT (or simulated OUTPUT)* which, from an instructional point of view, is the best candidate for use in training.

To Be Simulated:

INPUT		ACTION		OUTPUT		SIMULATION CANDIDATES		
						#1	#2	#3
1.	Auto to be passed	Passes auto	CLEAR-ANCE BETWEEN THE TWO AUTOS*	Simulator with static pictures of two autos	Simulator with filmed (canned) pictures of two autos	Simulator with actual conditions (based on student performance) simulated	Photographs of trees	Photographs of clouds
2.	TREES*	Suitable soil	Planting recommended	Drawings of trees	Artificial trees	Photographs of trees	Artificial trees	Photographs of clouds
3.	DROWNING VICTIM*	Apply proper hold	Victim ready for towing	Person acting as victim	Film showing victim	A wooden figure serving as the victim	Film showing victim	Photographs of clouds
4.	CLOUD FORMATIONS*	Identifies type of cloud	Identification of types of clouds	Drawing of clouds	Verbal description of clouds	Photographs of clouds	Verbal description of clouds	Photographs of clouds
5.	CUSTOMER ROUTES IN DEPARTMENT STORE*	Identifies traffic flow pattern	Flow patterns identified	Maps of store showing routes and flow patterns	Frequency tabulations for traffic volume in each aisle	Pictures of crowd levels in sections of the store	Frequency tabulations for traffic volume in each aisle	Pictures of crowd levels in sections of the store

*What is to be simulated is presented in capitalized italics and is accompanied by an asterisk.

SEE ANSWERS

ANSWERS

EXERCISE 4A

Put an X through the simulated INPUT (or simulated OUTPUT)* which, from an instructional point of view, is the best candidate for use in training.

To Be Simulated:

INPUT ACTION OUTPUT

1. Auto to be passed	Passes auto	CLEAR-ANCE BETWEEN THE TWO AUTOS*
2. TREES*	Suitable soil	Planting recommended
3. DROWNING VICTIM*	Apply proper hold	Victim ready for towing
4. CLOUD FORMATION	Identifies type of cloud	Identification of types of clouds
5. CUSTOMER ROUTES IN DEPARTMENT STORE*	Identifies traffic flow pattern	Flow patterns identified

SIMULATION CANDIDATES

#1

Simulator with static pictures of two autos
Drawings of trees
Person acting as victim
Drawing of clouds
Maps of store showing routes and flow patterns

#2

Simulator with filmed (canned) pictures of two autos
Artificial trees
Film showing victim
Verbal description of clouds
Frequency tabulations for traffic volume in each aisle

#3

~~Simulator with actual conditions (based on student performance) simulated~~
Photographs of trees
A wooden figure serving as the victim
~~Photographs of clouds~~
Pictures of crowd levels in sections of the store

*What is to be simulated is presented in capitalised italics and is accompanied by an asterisk.

DO NEXT PROBLEM

EXERCISE 48

Put an X through the simulated ACTION which, from an instructional point of view, is the best candidate for use in training.

To Be Simulated:

INPUT ACTION OUTPUT

1. Auto parts (choke)	ASSEMBLES INPUTS IN CHOKE CORRECT SEQUENCE	Assembled
2. Faulty TV image	ADJUSTS IMAGE	Correct image
3. Malfunction in the sequence	LOCATES MALFUNCTION IDENTIFIED	Malfunction identified
4. Array of chemical solutions	MIXES SOLUTIONS compound	A
5. Car to pass	PASSES	Car passed

SIMULATION CANDIDATES

#3

From options presented him, selects parts next in the assembly sequence

#2

Points to parts in the order in which he would assemble them

#1

Verbally indicates an assembly sequence

Selects from multiple options the adjustment to make

Verbally indicates what adjustment to make

On simulated TV console turns knobs that produce a correct image

Selects one of two circuits as the one to investigate

Circles circuits he would investigate on circuit diagram

Selects from verbal options what circuits he would investigate

Selects from verbally presented options the amount of each solution to mix

Edits (verbally) an incorrectly selected amount of each solution

States verbally how much of each solution he would mix

In auto simulator turns wheel to pass auto ahead

In auto simulator calls out what he would do

In auto simulator presses buttons when passing should be done

SEE ANSWERS

ANSWERS

EXERCISE 4B

Put an X through the simulated ACTION which, from an instructional point of view, is the best candidate for use in training.

To Be Simulated:

INPUT	ACTION	OUTPUT
1. Auto parts (choke)	ASSEMBLES INPUTS IN CORRECT SEQUENCE	Assembles choke
2. Faulty TV image	ADJUSTS IMAGE	Correct image
3. Malfunction in the sequence	LOCATES MALFUNCTION	Malfunction identified
4. Array of chemical solutions	MIXES SOLUTIONS	A compound
5. Car to pass	PASSES	Car passed

SIMULATION CANDIDATES

#1

Verbally indicates an assembly sequence

~~On simulated TV console turns knobs that produce a correct image~~

Selects from verbal options what circuits he would investigate

~~States verbally how much of each solution he would mix~~

In auto simulator presses buttons when passing should be done

#2

~~Points to parts in the order in which he would assemble them~~

Verbally indicates what adjustment to make

~~Circles circuits he would investigate on circuit diagram~~

Edits (verbally) an incorrectly selected amount of each solution

In auto simulator calls out what he would do

#3

From options presented him, selects parts next in the assembly sequence

Selects from multiple options the adjustment to make

Selects one of two circuits as the one to investigate

Selects from verbally presented options the amount of each solution to mix

~~In auto simulator turns wheel to pass auto ahead~~

DO NEXT PROBLEM

EXERCISE 4C

For each problem below, devise a type of simulated practice which you feel is better than the one given (labelled "LESS DESIRABLE SIMULATION") and which you feel will make transfer easier.

Write in your recommendation in the column marked "RECOMMENDATION."

LESS DESIRABLE SIMULATION

INPUT ACTION OUTPUT

RECOMMENDATION

1.	Misbehaving child in class	Manages problem	Problem reduced	Responds orally to problems portrayed on film	
2.	Bleeding artery	Locate pressure point	Identified pressure point	Locating pressure spot on anatomical diagram	
3.	Inattentive child	Reinforces longer durations of attention	More attentive child	Verbal description of durations of attention	
4.	Wet or dry roads	Brakes car to suit conditions	Car in control	States how he would brake car for prevailing road conditions	
5.	TV image problem set	Adjusts set	Improved image	Critiques and edits (verbally) adjustments portrayed on film	

SEE ANSWERS

ANSWERS

EXERCISE 4C

For each problem below, devise a type of simulated practice which you feel is better than the one given (labelled "LESS DESIRABLE SIMULATION") and which you feel will make transfer easier. Write in your recommendation in the column marked "RECOMMENDATION."

LESS DESIRABLE SIMULATION			RECOMMENDATION	
INPUT	ACTION	OUTPUT		
1. Misbehaving child in class	Manages problem	Problem reduced	Responds orally to problems portrayed on film	Responds orally to problems acted out or role played out by actual children
2. Bleeding artery	Locate pressure point	Identified pressure point	Locating pressure spot on anatomical diagram	Locating pressure spot on human model or on dummy
3. Inattentive child	Reinforces longer durations of attention	More attentive child	Verbal description of durations of attention	Film showing increasing durations of attention
4. Wet or dry roads	Brakes car to suit conditions	Car in control	States how he would brake car for prevailing road conditions	Brakes car in simulator
5. TV image problem	Adjusts set	Improved image	Critiques and edits (verbally) adjustments portrayed on film	Makes adjustments on mock-up

END OF EXERCISE

Exercises 5A and 5B are designed to take into account logistical considerations when making a final decision about what type of simulation to use.

TURN TO NEXT PAGE FOR PROBLEMS

EXERCISE 5A

Put an X through the type of simulation which would be the most desirable from a logistical point of view (i.e., the smallest logistical burden would be involved).

To Be Simulated:			SIMULATION CANDIDATES		
INPUT	ACTION	OUTPUT	#1	#2	#3
1. Damaged crop	Identifies responsible insect	Identified cause	Samples of actual damaged crops	Enlarged photographs of damaged crops	Verbal descriptions of what damage looks like
2. Patient with skin condition	Observes and identifies condition	Diagnosis	Color photographs	Color motion picture film	Black and white photographs
3. TV malfunction symptoms	Locates malfunction cause	Identified problem	Printed descriptions of symptoms	Photographs of symptoms	Three-dimensional mock-up with symptoms displayed
4. Road conditions	Adjusts speed of auto	Speed appropriate for conditions	Photographs of conditions and printed descriptions of appropriate action to take	Film of conditions and printed description of action to take	Simulator mock-up with INPUT and ACTION capabilities
5. Damaged part in motor	Disassembles motor and replaces part	Repaired motor	Three dimensional functional mock-up of motor	Diagram showing location of parts of motor	Film of assembly and disassembly of motor

SEE ANSWERS

ANSWERS

EXERCISE 5A

Put an X through the type of simulation which would be the most desirable from a logistical point of view (i.e., the smallest logistical burden would be involved).

To Be Simulated:			SIMULATION CANDIDATES		
INPUT	ACTION	OUTPUT	#1	#2	#3
1. Damaged crop	Identifies responsible insect	Identified cause	Samples of actual damaged crops	Enlarged photographs of damaged crops	~~Verbal descriptions of what damage looks like~~
2. Patient with skin condition	Observes and identifies condition	Diagnosis	Color photographs	Color motion picture film	~~Black and white photographs~~
3. TV malfunction symptoms	Locates malfunction cause	Identified problem	~~Printed descriptions of symptoms~~	Photographs of symptoms	Three-dimensional mock-up with symptoms displayed
4. Road conditions	Adjusts speed of auto	Speed appropriate for conditions	~~Photographs of conditions and printed descriptions of appropriate action to take~~	Film of conditions and printed description of action to take	Simulator mock-up with INPUT and ACTION capabilities
5. Damaged part in motor	Disassembles motor and replaces part	Repaired motor	Three dimensional functional mock-up of motor	~~Diagram showing location of parts of motor~~	Film of assembly and disassembly of motor

DO NEXT PROBLEM

EXERCISE 5B

For each example below design simulated practice which you feel is a good compromise between what is offered as "best" from an instructional and from a logistical point of view.

To Be Simulated:		BEST INSTRUCTIONAL SIMULATION		BEST LOGISTICAL SIMULATION		YOUR COMPROMISE
INPUT	ACTION OUTPUT					
1. Facial expression of patient	Therapist deals with patient accordingly	An actor simulating the role of patients; therapist practices correct action		Concrete, verbally described situation; therapist produces correct action in writing		
2. Medieval and renaissance baroque paintings	Analyze treatment of light and shadow	Full color printed high quality reproductions		Black and white reproductions from textbooks shown with aid of overhead projector		
3. Patient to be X-rayed	Position patient and operate controls	Training model of X-ray machine controls and actual patient		Drawing of controls and positioning of patient; learner verbalizes about actions		
4. Tunnel traffic problems	Identify and report troubles	Film showing typical traffic problems (e.g., length of backup)		Schematic sketch of traffic problems		
5. Moving blip on radar screen	Identify distance of objectified	Film of blip moving across radar screen		Drawing of blip "path"		

SEE ANSWERS

ANSWERS

EXERCISE 5B

For each example below design simulated practice which you feel is a good compromise between what is offered as "best" from an instructional and from a logistical point of view.

To Be Simulated:		BEST LOGISTICAL SIMULATION		
INPUT	ACTION	OUTPUT	BEST INSTRUCTIONAL SIMULATION	YOUR COMPROMISE
1. Facial expression of patient	Therapist deals with patient accordingly	Best patient treatment	An actor simulating the role of patients; therapist practices correct action	Photographs of facial expressions showing mood of patient to which therapist responds
2. Medieval and renaissance of light baroque and paintings shadow	Analyze treatment analysed	Paintings analysed	Full color printed high quality reproduction	Colored slides of painting
3. Patient to be X-rayed and operate controls	Position patient and operate controls	Patient X-rayed	Training model of X-ray machine controls and actual patient	Mock-up of machine with non-functioning controls and dummy
4. Tunnel traffic problems	Identify and report troubles	Problems reported	Film showing typical traffic problems (e.g., length of backup)	Photographs of backed-up traffic
5. Moving blip on radar screen	Identify distance of objectified	Distance identified	Film of blip moving across radar screen	Mechanical model with hand-operated discs showing moving blips

END OF EXERCISE

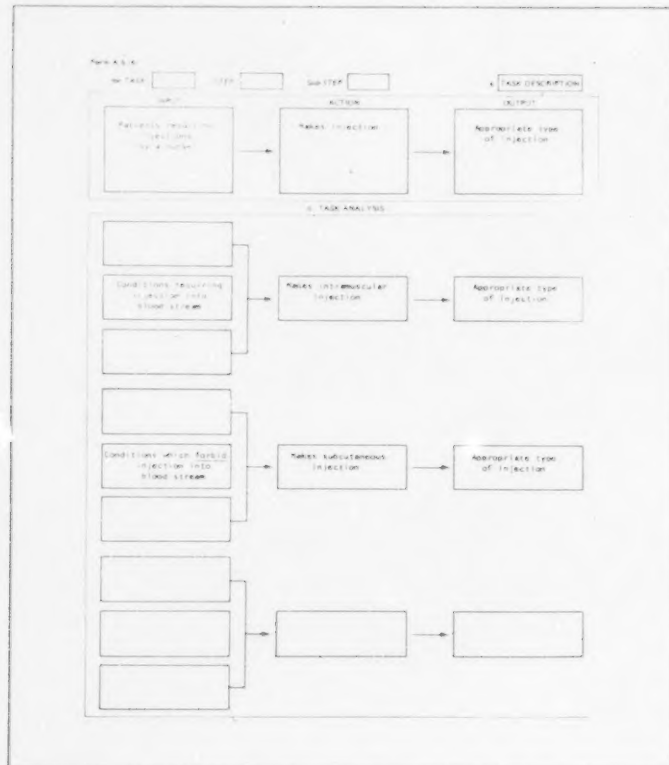
This exercise is designed to give you practice in planning simulation in working from and with actual forms.

Review the analysis results on the next page and then fill in simulation form, FORM E.1(1), on page E-34a.

Complete all these steps:

- (a) Assess the seriousness of need for simulation based on each logistical and instructional factor;
- (b) Decide whether to simulate (write in "yes" or "no" on form);
- (c) If yes, devise alternative simulation plans;
- (d) Identify final choice (with check marks ✓)

FOLD OUT THIS PAGE



COMPETENCY ANALYSIS	1. LEARNING ANALYSIS	2. REUSE ANALYSIS
INPUT	DIFFICULTY IN REASONING DISCRIMINATIONS NO. OF DISCRIMINATIONS NO. OF PROPERTIES NO. OF INQUIRIES GENERALIZATIONS DISCRIMINATIONS NO. OF DISCRIMINATIONS NO. OF PROPERTIES NO. OF INQUIRIES	DISCRIMINATIONS NO. OF DISCRIMINATIONS NO. OF PROPERTIES NO. OF INQUIRIES GENERALIZATIONS DISCRIMINATIONS NO. OF DISCRIMINATIONS NO. OF PROPERTIES NO. OF INQUIRIES
ACTION	ASSOCIATIONS NO. OF ASSOCIATIONS ASSOCIATIVE STRENGTH OF OTHER ACTIONS GENERALIZATIONS ASSOCIATIONS NO. OF ASSOCIATIONS ASSOCIATIVE STRENGTH OF OTHER ACTIONS	ASSOCIATIONS NO. OF ASSOCIATIONS ASSOCIATIVE STRENGTH OF OTHER ACTIONS GENERALIZATIONS ASSOCIATIONS NO. OF ASSOCIATIONS ASSOCIATIVE STRENGTH OF OTHER ACTIONS
OUTPUT	DISCRIMINATIONS NO. OF DISCRIMINATIONS NO. OF PROPERTIES NO. OF INQUIRIES GENERALIZATIONS DISCRIMINATIONS NO. OF DISCRIMINATIONS NO. OF PROPERTIES NO. OF INQUIRIES	DISCRIMINATIONS NO. OF DISCRIMINATIONS NO. OF PROPERTIES NO. OF INQUIRIES GENERALIZATIONS DISCRIMINATIONS NO. OF DISCRIMINATIONS NO. OF PROPERTIES NO. OF INQUIRIES

LESSON OBJECTIVE SIMULATION
DECISIONS

a. assessing simulation needs due to

LOGISTICAL CONSIDERATIONS

downtime

cost

danger

INSTRUCTIONAL CONSIDERATIONS

sampling

standardization

manipulation

b. planning simulation when needed

INPUT types

people

man made objects

natural objects

events

words

symbols

other

PROPERTIES: physical, psychological

SIMULATION PLANS: visual, audio, etc.

ACTION types

perceptual

motor

vocal

sub-vocal

OUTPUT types

people

man made objects

natural objects

events

words

symbols

other

SEE ANSWERS

ANSWERS

LESSON

OBJECTIVE

SIMULATION
DECISIONS

a. assessing simulation needs due to

LOGISTICAL CONSIDERATIONS			INSTRUCTIONAL CONSIDERATIONS		
downtime	cost	danger	sampling	standardization	manipulation
N	N	S	N	N	N

b. planning simulation when needed

INPUT types	PROPERTIES: physical, psychological	SIMULATION PLANS: visual, audio, etc.
people ✓	<i>-Something to be injected into</i> <i>-Resistance to needle</i> <i>-Hypodermic to be inserted</i>	<i>-Orange or other type of fruit</i> <i>PLUS</i> <i>-Actual hypodermic</i> ✓
man made objects ✓		
natural objects		
events		
words		
symbols		
other		
ACTION types		
perceptual	<i>Thrust and angle of injection</i>	<i>Does actual injection</i>
motor		
vocal		
sub-vocal		
OUTPUT types		
people	<i>-Correct angle</i>	<i>-Empty hypodermic</i> <i>-Correct angle</i>
man made objects		
natural objects		
events		
words		
symbols		
other		

FOLD BACK PAGE E-33

NOW DO FINAL EXERCISE

#5

WHICH APPEARS IN THE
FINAL EXERCISES VOLUME

FOLD BACK THE BLUE PAGE

E-36 / E-37

FOLD OUT THIS PAGE AND
FOLLOW THE 'D' SCHEDULE INSIDE

EXERCISES FOR TASK D

	After Reading HANDBOOK Sections	On HANDBOOK Pages	On WORKBOOK Exercises	On WORKBOOK Pages	Type of Practice
1.	D.1.1.1	11 - 13	1A - 1B	D1 - D5	Identifying criterion, subcriterion, and preparatory object
2.	D.1.1.2 - D.1.1.3	15 - 33	2	D7 - D9	Deciding whether to provide performance
3.	D.1.1.4	35 - 43	3	D11 - D13	Deciding on one or more performance direction
4.	D.1.1.5	45 - 55	4	D15 - D17	Deciding on how much criterion behavior to sample
5.	D.2.1.1	57 - 77	5A - 5D	D19 - D29	Assessing adequacy of statements of object
6.	D.2.2.2	79 - 103	6	D31 - D33	Preparing statements of object
7.	D.2.3.3	105 - 125	7	D35 - D37	Preparing statements of objectives to be given to students

8. **WHEN YOU HAVE COMPLETED ALL THE EXERCISES IN THIS SECTION OF THE WORKBOOK, PROCEED TO FINAL EXERCISE #6 IN THE FINAL EXERCISES VOLUME.*

After reading
Handbook for
sub STEP(S)

D.1.1

DO
EXERCISE

1

Exercises 1A and 1B are designed to give you practice in the identification of criterion objectives and preparatory objectives.

TURN TO NEXT PAGE FOR PROBLEMS

EXERCISE 1A

This exercise is designed to give you practice identifying performance which is self-contained and should therefore be treated as a criterion objective, and performance which is not self-contained and should therefore be treated as a preparatory objective.

For each pair of examples below (A and B), enter the letter A or B in the column which identifies the type of objective you judge the example to be.

General Subject Matter or Performance Area		Should be treated as a: CRITERION PREPARATORY Objective Objective	
		A B	
1. Algebra	Raising numbers to the power indicated by an exponent	Identifying numbers with and without exponents or with different exponents	
2. Telling time	Identifying the minute hand and the hour hand	Reporting time to the nearest second	
3. History	Comparing and contrasting several theories of historical change	Listing what variables a theory of historical change must deal with	
4. English	Writing an essay	Writing paragraphs which have a logical progression of ideas	
5. Physics	Defining concepts involved in Ohm's Law	Given a problem, selecting Ohm's Law as the one to solve it, substituting values in the formula and solving problem	

SEE ANSWERS

ANSWERS

EXERCISE 1A

This exercise is designed to give you practice identifying performance which is self-contained and should therefore be treated as a criterion objective, and performance which is not self-contained and should therefore be treated as a preparatory objective.

For each pair of examples below (A and B), enter the letter A or B in the column which identifies the type of objective you judge the example to be.

Should be treated as a:
CRITERION PREPARATORY
Objective Objective

	General Subject Matter or Performance Area	A		B	
		Should be treated as a: CRITERION PREPARATORY Objective Objective		Should be treated as a: CRITERION PREPARATORY Objective Objective	
1.	Algebra	Raising numbers to the power indicated by an exponent		Identifying numbers with and without exponents or with different exponents	
2.	Telling time	Identifying the minute hand and the hour hand		Reporting time to the nearest second	
3.	History	Comparing and contrasting several theories of historical change		Listing what variables a theory of historical change must deal with	
4.	English	Writing an essay		Writing paragraphs which have a logical progression of ideas	
5.	Physics	Defining concepts involved in Ohm's Law		Given a problem, selecting Ohm's Law as the one to solve it, substituting values in the formula and solving problem	

DO NEXT PROBLEM

EXERCISE 1B

This exercise is designed to give you practice determining which skill components should and should not be identified as preparatory objectives. Put an X through the objective in the column which should probably not be identified as a preparatory objective. If both examples should be treated as preparatory examples, do not put an X through either.

Training Situation	Diagram of Skill Components			Skills Which Should NOT Be Identified As Preparatory Objectives	
				a	b
1. Seventh grade art students must construct a color wheel. They have not yet learned which colors are primary, secondary, or intermediate.	Primary colors	Place in outside circle	Primary colors correctly placed	Discriminating among colors which are primary, secondary, and intermediate	Associating the type of color with its position on the color wheel
	Secondary colors	Place in middle circle	Secondary colors correctly placed		
	Intermediate colors	Place in outside circle	Intermediate colors correctly placed		
2. Vocational high school students must select best insulator for direct-current circuits	Motors	Select and use fiber	Fiber insulation used	Discriminating among inputs	Associating the equipment or fixture with the correct type of insulator
	Toasters or other (non-motor) appliances	Select mica	Mica insulation used		
	Outlets and switches	Select bakelite	Bakelite insulation used		
3. Third graders who can already pronounce the sounds of all letters in the alphabet must identify which are called consonants and which are called vowels	a, e, i, o, u	Labels as vowels	Vowels	Discriminating between letters in the alphabet	Associating the labels with the appropriate letters
	b, c, d, f, etc.	Labels as consonants	Consonants		

SEE ANSWERS

ANSWERS

EXERCISE 1B

This exercise is designed to give you practice determining which skill components should and should not be identified as preparatory objectives. Put an X through the objective in the column which should probably not be identified as a preparatory objective. If both examples should be treated as preparatory examples, do not put an X through either.

Training Situation	Diagram of Skill Components			Skills Which Should NOT Be Identified As Preparatory Objectives	
				a	b
1. Seventh grade art students must construct a color wheel. They have not yet learned which colors are primary, secondary, or intermediate.	Primary colors	→	Place in outside circle	→	Primary colors correctly placed
	Secondary colors	→	Place in middle circle	→	Secondary colors correctly placed
	Intermediate colors	→	Place in outside circle	→	Intermediate colors correctly placed
					Associating the type of color with its position on the color wheel
2. Vocational high school students must select best insulator for direct-current circuits	Motors	→	Select and use fiber	→	Fiber insulation used
	Toasters or other (non-motor) appliances	→	Select mica	→	Mica insulation used
	Outlets and switches	→	Select bakelite	→	Bakelite insulation used
					Associating the equipment or fixture with the correct type of insulator
3. Third graders who can already pronounce the sounds of all letters in the alphabet must identify which are called consonants and which are called vowels	a, e, i, o, u	→	Labels as vowels	→	Vowels
	b, c, d, f, etc.	→	Labels as consonants	→	Consonants
					Discriminating between letters in the alphabet
					Associating the labels with the appropriate letters

END OF EXERCISE

After reading
Handbook for
sub-STEP(S)

D.1.2-D.1.3

DO
EXERCISE

2

This exercise is designed to give you practice deciding whether or not performance aids should be provided for use during the criterion behavior.

TURN TO NEXT PAGE FOR PROBLEMS

EXERCISE 2

For each example indicate your decision with a yes or no answer. If you give a yes answer, indicate the training role it will play.

Recommendation regarding
desirability of having
aids available

Criterion Behavior

YES

NO

1. Using a slide rule for computations		
2. Having a table of multiplication (products) on hand		
3. Having a table of logarithms on hand for use when doing computations with logarithms		
4. Having a French dictionary on hand for students who must read scientific papers in French		
5. Radar operator at air traffic control center identifying patterns and radioing instructions; having examples of possible patterns on hand as guide		
6. Statistical clerk having formulas on hand for computation of all the various types of statistics he is expected to compute		
7. Opera singer performing in two or three different operas a week; having a prompter on hand in a prompter's box to aid recall (when necessary)		
8. Secretary who types letters has a handbook with examples and rules for how to address officials in a variety of professional walks of life		
9. A doctor must select from a range of available drugs those suitable for conditions he encounters frequently and infrequently		
10. Worker on an auto assembly line has several operations to perform		

ANSWERS

EXERCISE 2

For each example indicate your decision with a yes or no answer. If you give a yes answer, indicate the training role it will play.

Criterion Behavior	Recommendation regarding desirability of having aids available	
	YES	NO
1. Using a slide rule for computations		X
2. Having a table of multiplication (products) on hand		X
3. Having a table of logarithms on hand for use when doing computations with logarithms	X	
4. Having a French dictionary on hand for students who must read scientific papers in French	X	
5. Radar operator at air traffic control center identifying patterns and radioing instructions; having examples of possible patterns on hand as guide		X
6. Statistical clerk having formulas on hand for computation of all the various types of statistics he is expected to compute	X	
7. Opera singer performing in two or three different operas a week; having a prompter on hand in a prompter's box to aid recall (when necessary)	X	
8. Secretary who types letters has a handbook with examples and rules for how to address officials in a variety of professional walks of life	X	
9. A doctor must select from a range of available drugs those suitable for conditions he encounters frequently and infrequently	X	
10. Worker on an auto assembly line has several operations to perform		X

After reading
Handbook for
sub-STEP(S)

D.1.4

DO
EXERCISE

3

This exercise is designed to give you practice identifying situations in which objectives should require practice in one or two performance directions.

TURN TO NEXT PAGE FOR PROBLEMS

EXERCISE 3

For each of the examples below, put an X in the appropriate column indicating your judgment (based on potential learning difficulties involved) as to whether practice in one or two performance directions should be required.

Criterion Behavior	INPUTS	ACTION	One Direction (forward)	Two Directions (forward and reverse)
1. Cleaning up stains occurring in the home (home economics)	Type of stains	Selection of types of cleaners (from performance aid)		
2. Translating from and writing in Spanish	Spanish words	Using English equivalents		
3. Defining and illustrating declarative, interrogative, and imperative sentences	Example of each type of sentence	Apply appropriate label		
4. Diagnosing a malfunction in an automobile from sound of motor	Sound of engine running	Identify malfunction type		
5. Determining correct postage from a scale with rate charts built into it	Readings on scale for different classes of mail	Determine postage required		
6. Given a physics problem, selecting and using right formula to solve it	Problem requiring Ohm's Law	Select and use Ohm's Law		
7. Contrasting the philosophical concepts: "realism" and "nominalism"	Terms	Give definition and/or examples		
8. Writing test items for specifications in a variety of subject matters	Specifications for test items	Create test items		
9. Identifying vowels and consonants	Terms "vowels" and "consonants"	Give letters corresponding to each category		
10. Expanding a binomial	An example of a binomial to be expanded	Expand		

ANSWERS

EXERCISE 3

For each of the examples below, put an X in the appropriate column indicating your judgment (based on potential learning difficulties involved) as to whether practice in one or two performance directions should be required.

	Criterion Behavior	INPUTS	ACTION	One Direction (forward)	Two Directions (forward and reverse)
1.	Cleaning up stains occurring in the home (home economics)	Type of stains	Selection of types of cleaners (from performance aid)	X	
2.	Translating from and writing in Spanish	Spanish words	Using English equivalents		X
3.	Defining and illustrating declarative, interrogative, and imperative sentences	Example of each type of sentence	Apply appropriate label		X
4.	Diagnosing a malfunction in an automobile from sound of motor	Sound of engine running	Identify malfunction type	X	
5.	Determining correct postage from a scale with rate charts built into it	Readings on scale for different classes of mail	Determine postage required	X	
6.	Given a physics problem, selecting and using right formula to solve it	Problem requiring Ohm's Law	Select and use Ohm's Law		X
7.	Contrasting the philosophical concepts: "realism" and "nominalism"	Terms	Give definition and/or examples		X
8.	Writing test items for specifications in a variety of subject matters	Specifications for test items	Create test items	X	
9.	Identifying vowels and consonants	Terms "vowels" and "consonants"	Give letters corresponding to each category		X
10.	Expanding a binomial	An example of a binomial to be expanded	Expand	X	

This exercise is designed to give you practice determining how much of a sample of the total criterion behavior should be represented in a statement of objectives.

TURN TO NEXT PAGE FOR PROBLEMS

EXERCISE 4

For each description of INPUTS below, check either column a, b, or c indicating how much of the criterion situation should be represented in a statement of objectives.

INPUTS		Members to be included:		
		a. All	b. Large Sample	c. Small Sample
1.	Elements in nature: There are 103 different elements in nature. Each element represents a different class.			
2.	The Elephantidae family of mammals consists of one member, the elephant.			
3.	There are four classes of musical notes to be learned: whole, half, quarter, and eighth. Each class includes multiple examples of notes held for a fixed duration.			
4.	The class of INPUTS is "Baroque music." All Baroque music is characterized by a repetition and elaboration of a single line, overlap of thematic entrance, and contrasting movement.			
5.	The class of INPUTS is vertebrates: Any animal with a segmented spinal column. Members include mammals, birds, reptiles, amphibians, and fishes.			
6.	Bears - The many difficult classes of bears are all characterized by their massive bodies, coarse, heavy fur, relatively short limbs, and almost rudimentary tails.			
7.	The classes of INPUTS involve audiovisual methods in teaching; each class involves a wide range of types.			
8.	Two classes of INPUTS are involved: (a) $[x - y]$, and (b) $[x - (y)]$. It is possible to substitute a wide range of numbers in these equations.			
9.	Two classes of INPUTS involve varied examples of "transitive" and "intransitive" verbs.			
10.	There are twenty-six classes of INPUTS, one for each letter of the alphabet.			

ANSWERS

EXERCISE 4

For each description of INPUTS below, check either column a, b, or c indicating how much of the criterion situation should be represented in a statement of objectives.

	INPUTS	Members to be included:		
		a. All	b. Large Sample	c. Small Sample
1.	Elements in nature: There are 103 different elements in nature. Each element represents a different class.	X		
2.	The Elephantidae family of mammals consists of one member, the elephant.	X		
3.	There are four classes of musical notes to be learned: whole, half, quarter, and eighth. Each class includes multiple examples of notes held for a fixed duration.			X
4.	The class of INPUTS is "Baroque music." All Baroque music is characterized by a repetition and elaboration of a single line, overlap of thematic entrance, and contrasting movement.			X
5.	The class of INPUTS is vertebrates: Any animal with a segmented spinal column. Members include mammals, birds, reptiles, amphibians, and fishes.		X	
6.	Bears - The many difficult classes of bears are all characterized by their massive bodies, coarse, heavy fur, relatively short limbs, and almost rudimentary tails.			X
7.	The classes of INPUTS involve audiovisual methods in teaching; each class involves a wide range of types.		X	
8.	Two classes of INPUTS are involved: (a) $[x - y]$, and (b) $[x - (y)]$. It is possible to substitute a wide range of numbers in these equations.			X
9.	Two classes of INPUTS involve varied examples of "transitive" and "intransitive" verbs.		X	
10.	There are twenty-six classes of INPUTS, one for each letter of the alphabet.	X		

After reading
Handbook for
sub STEP(S)

D.2.1

DO
EXERCISE

5

Exercises 5A-5D are designed to give you practice in deciding on the adequacy with which statements of objectives have been formulated.

TURN TO NEXT PAGE FOR PROBLEMS

EXERCISE 5A

Below are three statements of objectives written with varying degrees of completeness for the same criterion behavior.

Check the number of the one which you judge to be the most complete.

Form D 2(1)

LESSON

5

SPECIFICATION OF OBJECTIVES

	GIVEN	STUDENT WILL	RESULTING IN
	Criterion Inputs • mode: visual/verbal/etc. • number of examples from class • new and/or old examples • typical/atypical conditions • availability of performance aids	Criterion Actions • mode: recognition, editing, production • alternatives: new and/or old examples • mode: perceptual/motor/vocal/sub-vocal	Criterion Outputs • mode: visual/verbal/etc. • limits: standards • quantitative: amount /degree/time limits • qualitative
1.	Given a novel which has not been used in instruction	The student will interpret the theme of the novel	A statement of the central theme with supporting references to persons, objects, or events in the text
2.	Given a novel which has not been used in instruction	The student will state the themes of the novel and support his interpretation	A statement of the central and subordinate themes with supporting examples from the text. Citation of interpretations offered by at least two critics
3.	Given a French novel (in English translation)	The student will interpret with supporting material the theme of the novel	A supported statement of the central theme

ANSWERS

EXERCISE 5A

Below are three statements of objectives written with varying degrees of completeness for the same criterion behavior.

Check the number of the one which you judge to be the most complete.

Form D-2(1)

LESSON

5

SPECIFICATION OF OBJECTIVES

	GIVEN	STUDENT WILL	RESULTING IN
	Criterion Inputs • mode: visual/verbal/etc • number of examples from class • new and/or old examples • typical/atypical conditions • availability of performance aids	Criterion Actions • mode: recognition, editing, production • alternatives: new and/or old examples • mode: perceptual/motor/vocal/sub-vocal	Criterion Outputs • mode: visual/verbal/etc • limits: standards • quantitative: amount, degree/time limits • qualitative
1.	Given a novel which has not been used in instruction	The student will interpret the theme of the novel	A statement of the central theme with supporting references to persons, objects, or events in the text
2.	Given a novel which has not been used in instruction	The student will state the themes of the novel and support his interpretation	A statement of the central and subordinate themes with supporting examples from the text. Citation of interpretations offered by at least two critics
3.	Given a French novel (in English translation)	The student will interpret with supporting material the theme of the novel	A supported statement of the central theme

EXERCISE 5B

Below are three criterion objectives written with varying degrees of objectivity for the same criterion behavior.

Check the number of the one which you judge to be the most objective.

Form D-2011

LESSON

5

SPECIFICATION OF OBJECTIVES

	GIVEN	STUDENT WILL	RESULTING IN
	Criterion Inputs • mode: visual/verbal/etc • number of examples from class • new and/or old examples • typical/atypical conditions • availability of performance aids	Criterion Actions • mode: recognition, sorting, production • alternatives: new and/or old examples • mode: perceptual/motor/vocal/sub-vocal	Criterion Outputs • mode: visual/verbal/etc • limits, standards • quantitative: amount, degree, time limits • qualitative
1.	Given a list of five possible definitions	Student will check off the one which most accurately describes the positions of idle discharge ports in the idle speed system	Check alongside statement which describes the idle discharge ports as being located just above and below the throttle valve
2.	Given a list of possible definitions	Student will choose the best description of idle discharge ports	Selection of statement which describes the idle discharge
3.	Given a list of five possible alternatives	Student will indicate the one which best describes the idle speed system	Selection of statement which describes the accurate position of the idle discharge ports

SEE ANSWERS

ANSWERS

EXERCISE 5B

Below are three criterion objectives written with varying degrees of objectivity for the same criterion behavior.

Check the number of the one which you judge to be the most objective.

Form D-231

LESSON

5

SPECIFICATION OF OBJECTIVES

	GIVEN Criterion Inputs	STUDENT WILL Criterion Actions	RESULTING IN Criterion Outputs
	• mode: visual/verbal/etc • number of examples from class • new and/or old examples • typical/atypical conditions • availability of performance aids	• mode: recognition/editing/production • alternatives: new and/or old examples • mode: perceptual/motor/vocal/sub-vocal	• mode: visual/verbal/etc • limits: standards • quantitative: amount/degree/time limits • qualitative
1	Given a list of five possible definitions	Student will check off the one which most accurately describes the positions of idle discharge ports in the idle speed system	Check alongside statement which describes the idle discharge ports as being located just above and below the throttle valve
2	Given a list of possible definitions	Student will choose the best description of idle discharge ports	Selection of statement which describes the idle discharge
3	Given a list of five possible alternatives	Student will indicate for one which best describes the idle speed system	Selection of statement which describes the accurate position of the idle discharge ports

DO NEXT PROBLEM

EXERCISE 5C

Below are three criterion objectives written varying in degree of implications they have for training with respect to the same criterion behavior.

Check the one which is best in terms of its usefulness for prescribing training and testing.

Form D 2(1)

LESSON

5

SPECIFICATION OF OBJECTIVES

	GIVEN Criterion Inputs	STUDENT WILL Criterion Actions	RESULTING IN Criterion Outputs
	• mode: visual/verbal/etc • number of examples from class • new and/or old examples • typical/atypical conditions • availability of performance aids	• mode: recognition, editing, production • alternatives: new and/or old examples • mode: perceptual/motor/vocal/sub-vocal	• mode: visual/verbal/etc • limits, standards • quantitative: amount/degree/time limits • qualitative
1.	Given examples of two rats of the same age, one bred on a well balanced diet and one bred on a poorly balanced diet	The student will list differences in physical features	Two lists identifying well nourished and poorly nourished
2.	Given photographs of two rats, one bred on a well balanced diet and one bred on a poorly balanced diet	The student will list differences in physical features of stance, bone structure, coat, and condition of feet	Two lists: well nourished - alert stance, well formed body, smooth, shiny coat, smooth-skinned feet; poorly nourished - drooping stance, small bone structure, thin, uneven coat, and scaly, rough feet
3.	Given photographs of two rats, one bred on a well balanced diet and one bred on a poorly balanced diet	The student will list differences in physical features of stance, bone structure, coat, and condition of feet	Two lists identifying well nourished and poorly nourished attributes of stance, bone structure, and coat

SEE ANSWERS

ANSWERS

EXERCISE 5C

Below are three criterion objectives written varying in degree of implications they have for training with respect to the same criterion behavior.

Check the one which is best in terms of its usefulness for prescribing training and testing.

Form D 2(1)

LESSON

5

SPECIFICATION OF OBJECTIVES

	GIVEN Criterion Inputs	STUDENT WILL Criterion Actions	RESULTING IN Criterion Outputs
	• mode: visual/verbal/etc. • number of examples from class • new and/or old examples • typical/atypical conditions • availability of performance aids	• mode: recognition, editing, production • alternatives: new and/or old examples • mode: perceptual/motor/vocal/sub-vocal	• mode: visual/verbal/etc. • limits, standards • quantitative: amount / degree / time limits • qualitative
1.	Given examples of two rats of the same age, one bred on a well balanced diet and one bred on a poorly balanced diet	The student will list differences in physical features	Two lists identifying well nourished and poorly nourished
2.	Given photographs of two rats, one bred on a well balanced diet and one bred on a poorly balanced diet	The student will list differences in physical features of stance, bone structure, coat, and condition of feet	Two lists: well nourished - alert stance, well formed body, smooth, shiny coat, smooth-skinned feet; poorly nourished - drooping stance, small bone structure, thin, uneven coat, and scaly, rough feet
3.	Given photographs of two rats, one bred on a well balanced diet and one bred on a poorly balanced diet	The student will list differences in physical features of stance, bone structure, coat, and condition of feet	Two lists identifying well nourished and poorly nourished attributes of stance, bone structure, and coat

DO NEXT PROBLEM

EXERCISE 5D

This exercise is designed to give you practice developing a statement of criterion objectives, working from the results of task analysis, learning analysis, competency analysis, and mode analysis.

Below are decisions already made concerning formulation of objectives.

On the next page is a completed A.5(4) form. Study the form and then write a statement of criterion objectives on page D-28a.

SUMMARY OF DECISIONS REGARDING FORMULATION OF OBJECTIVES

Criterion behavior identified as self-contained total performance

Decision made to require TRANSFER

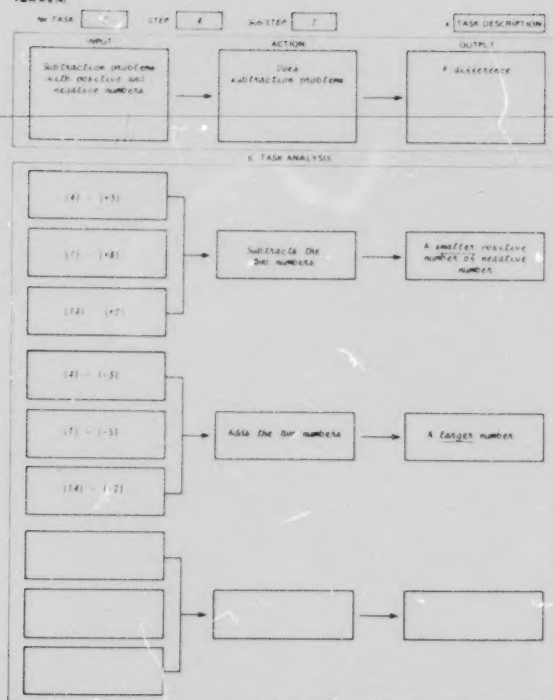
Decision made not to include use of aids in a statement of objectives

Decision to require forward direction only in statement of objectives

Decision to sample a relatively large number of members belonging to each class of INPUTS represented in the task analysis diagrams

FOLD OUT THIS PAGE

Form A-6 (4)



COMPETENCY ANALYSIS	LEARNING ANALYSIS		MODE ANALYSIS	
	Level of difficulty in acquiring		Level of difficulty in using	
INPUT	No. of problems No. of positive No. of negative	No. of positive No. of negative No. of mixed	No. of positive No. of negative No. of mixed	No. of positive No. of negative No. of mixed
ACTION CHAIN	No. of problems No. of positive No. of negative	No. of positive No. of negative No. of mixed	No. of positive No. of negative No. of mixed	No. of positive No. of negative No. of mixed
OUTPUT	No. of problems No. of positive No. of negative	No. of positive No. of negative No. of mixed	No. of positive No. of negative No. of mixed	No. of positive No. of negative No. of mixed

LESSON

SPECIFICATION OF OBJECTIVES

	GIVEN	STUDENT WILL	RESULTING IN
	Criterion Inputs • mode: visual/verbal/etc. • number of examples from class • new and/or old examples • typical/atypical conditions • availability of performance aids	Criterion Actions • mode: recognition, editing, production • alternatives: new and/or old examples • mode: perceptual/motor/vocal/sub-vocal	Criterion Outputs • mode: visual/verbal/etc. • limits, standards • quantitative: amount /degree/time limits • qualitative
1.			
2.			
3.			

SEE ANSWERS

LESSON **ANSWERS**

SPECIFICATION OF OBJECTIVES

GIVEN	STUDENT WILL	RESULTING IN
Criterion Inputs ● mode: visual/verbal/etc. ● number of examples from class ● new and/or old examples ● typical/stypical conditions ● availability of performance aids ➤	Criterion Actions ● mode: recognition, editing, production ● alternatives: new and/or old examples ● mode: perceptual/motor/vocal/sub-vocal ➤	Criterion Outputs ● mode: visual/verbal/etc. ● limits, standards ● quantitative: amount /degree/time limits ● qualitative ➤
▼ 1. Given any subtraction problem (new or old) involving the subtraction of positive or negative numbers from the minuend	▼ Student will subtract the two numbers when both are positive and will add the two numbers when the subtrahend is negative	▼ A smaller number (or a negative number) when both are positive; a larger number when one is negative; will get at least 90 percent of problems correct
▼	▼	▼
▼	▼	▼

FOLD BACK PAGE D-27

This exercise is designed to give you practice preparing criterion and preparatory objectives.

The student's capability to engage in practice of criterion behavior as diagrammed on the next page is assessed as follows:

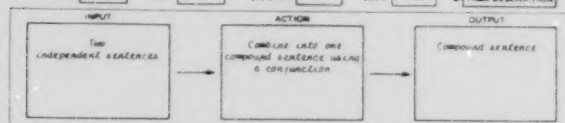
1. The student is not capable of producing a compound sentence on request.
2. The student is able to write compound sentences when provided with a model compound sentence.

All the analysis results for this lesson are presented on the next page. Using the information above and the analysis on the next page, prepare a criterion objective and a preparatory objective.

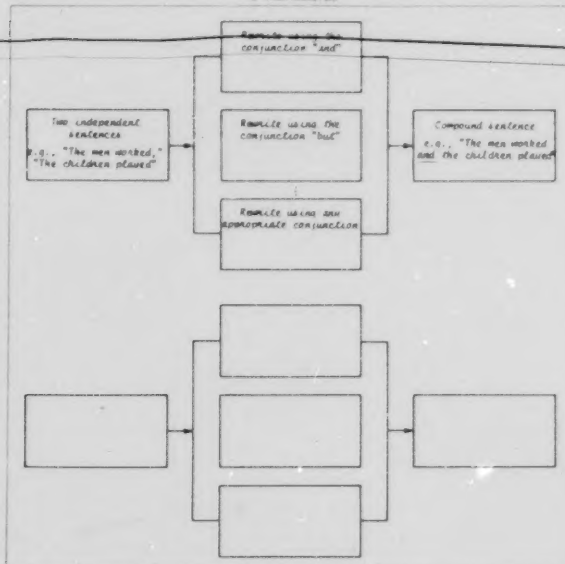
FOLD OUT THIS PAGE

Form A-5171 SUPPLEMENTARY

Task: 8 Step: 5 Sub-step: 1 Cell: V.B. Task Description:



5 TASK ANALYSIS



COMPETENCY ANALYSIS	1. LEARNING ANALYSIS	2. MODE ANALYSIS
	Level of difficulty in measuring	
INPUT	DISCRIMINATIONS due to similarity No. of properties No. of inputs GENERALIZATIONS discrimination No. of properties No. of inputs	Visual Non-visual Other
ACTION CHAIN	ASSOCIATIONS No. of associations Associative strength of other actions GENERALIZATIONS integrative strength of action CHAINS length of chain output discrimination problems associative strength of other actions	Verbal Non-verbal Other
OUTPUT	DISCRIMINATIONS due to similarity No. of properties No. of inputs GENERALIZATIONS discrimination No. of properties No. of inputs	Visual Non-visual Other

LESSON

SPECIFICATION OF OBJECTIVES

	GIVEN	STUDENT WILL	RESULTING IN
	Criterion Inputs • mode: visual/verbal/etc. • number of examples from class • new and/or old examples • typical/atypical conditions • availability of performance aids	Criterion Actions • mode: recognition, editing, production • alternatives: new and/or old examples • mode: perceptual/motor/vocal/sub-vocal	Criterion Outputs • mode: visual/verbal/etc. • limits, standards • quantitative: amount /degree/time limits • qualitative
CRITERION			
1.			
PREPARATORY			
2.			
3.			

SEE ANSWERS

LESSON **ANSWERS**

SPECIFICATION OF OBJECTIVES

GIVEN

Criterion Inputs

- mode: visual/verbal/etc.
- number of examples from class
- new and/or old examples
- typical/atypical conditions
- availability of performance aids

STUDENT WILL

Criterion Actions

- mode: recognition, editing, production
- alternatives: new and/or old examples
- mode: perceptual/motor/vocal/sub vocal

RESULTING IN

Criterion Outputs

- mode: visual/verbal/etc.
- limits, standards
- quantitative: amount /degree/time limits
- qualitative

CRITERION

1.

Given any pair of independent sentences not used during instruction

The student will rewrite the sentences joining them with an appropriate conjunction

A compound sentence consisting of two independent sentences joined by a conjunction

PREPARATORY

2.

Given any pair of independent sentences, a model of a compound sentence, and a list of all possible conjunctions

The student will rewrite the sentence joining them with one of the conjunctions on the list

A compound sentence which in form matches the example and uses any conjunction on the list

OR

PREPARATORY

3.

Given a large sample of sentences, some being compound sentences with conjunctions and some not, and asked to identify which is the "compound" and to circle the conjunction

The student will identify the compound sentences by checking them and the conjunctions by circling them

Checks and circles indicating correct identifications on all compound sentences presented

FOLD BACK PAGE D-31

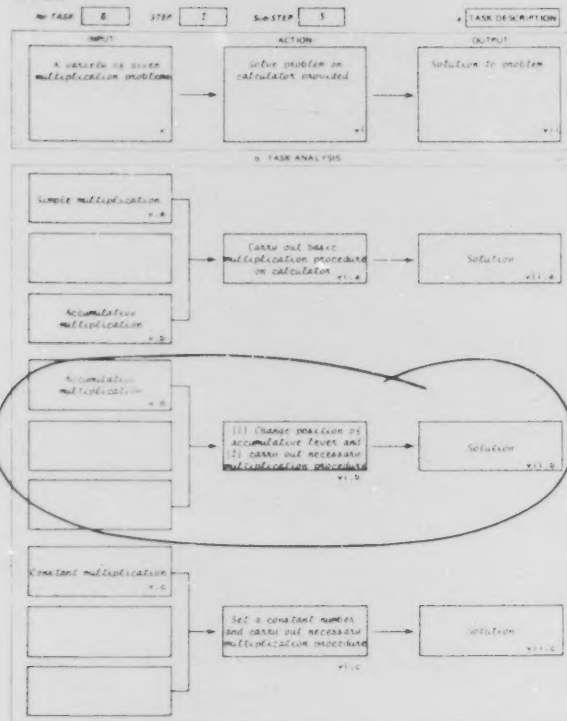
This exercise is designed to give you practice preparing statements of objectives for students.

Your task is to write a statement of objectives for a student who is learning to do various kinds of multiplication problems on a printing calculator. The objectives will cover only the portion of the lesson on accumulative multiplication, circled on the task analysis appearing on page D-36.

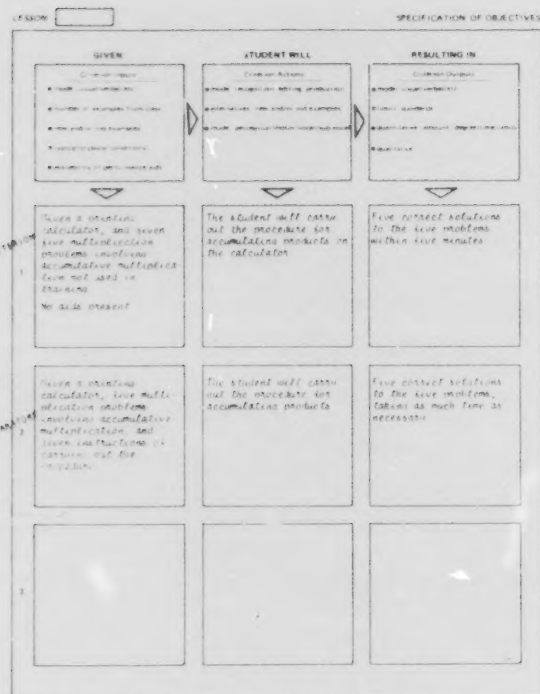
Study the forms on the next page, and then write the student objectives on FORM D.2(2) on page D-36a.

FOLD OUT THIS PAGE

Form A-6 (4)



Form A-7 (4)



LESSON STATEMENT OF OBJECTIVES
FOR STUDENTS

GIVEN	YOU WILL	YOU MUST LEARN TO
<u>Inputs</u> • objects, people, events, words, symbols, etc. • their properties • examples number new or old • availability of performance aids • typical/atypical conditions • problem format e.g., single input vs. multiple choice	<u>Actions</u> • select, edit, or produce • type of action e.g., point to, label, write, classify, etc. RESULTING IN <u>Outputs</u> • objects, events, words, symbols, etc. • their properties (quantity/quality) • standards of acceptability	• distinguish between examples from # <u>input classes</u> • on the basis of # <u>properties</u> • see similarity among examples within each of the # <u>input classes</u> • on the basis of # <u>properties</u> • associate one of with each one of the # <u>actions</u> # <u>input classes</u> • exhibit # <u>alternative actions</u> • exhibit the series of associations in the <u>chain</u>
▼	▼	▼
1.		
2.		
3.		

LESSON **ANSWERS**STATEMENT OF OBJECTIVES
FOR STUDENTS**GIVEN**Inputs

- objects, people, events, words, symbols, etc.
- their properties
- examples
 - number
 - new or old
- availability of performance aids
- typical/atypical conditions
- problem format
 - e.g., single input vs. multiple choice

YOU WILLActions

- select, edit, or produce
- type of action
 - e.g., point to, label, write, classify, etc.

RESULTING INOutputs

- objects, events, words, symbols, etc.
- their properties (quantity/quality)
- standards of acceptability

YOU MUST LEARN TO

- distinguish between examples from # input classes
- on the basis of # properties
- see similarity among examples within each of the # input classes
- on the basis of # properties
- associate one of with each one of the # actions
- exhibit # input classes
- exhibit the series of associations in the # alternative actions
- # chain

Given five accumulative multiplication problems and a printing calculator

You will perform the correct procedure on the calculator which will result in a correct answer for each of the five problems

You will have to learn to distinguish accumulative multiplication problems from other types of multiplication problems, to apply the procedures that are used for accumulative multiplication but not for other types, and to perform all these procedures in correct sequence

1.

2.

3.

FOLD BACK PAGE D-35

DO FINAL EXERCISE

#6

WHICH APPEARS IN THE
FINAL EXERCISES VOLUME

FOLD BACK THE BLUE PAGE

D-38 / D-39

FOLD OUT THIS PAGE AND
FOLLOW THE "C" SCHEDULE INSIDE

EXERCISES FOR TASK C

	After Reading HANDBOOK Sections	On HANDBOOK Pages	Do WORKBOOK Exercises	On WORKBOOK Pages	Type of Practice
1.	C.1.1	1 - 25	1	C-1 - C-3	Assembling separate task analysis results
2.	C.1.2 - C.2.2	27 - 65	2A - 2E	C-5 - C-15	Sequencing sub-criterion behaviors
3.	C.3.1 - C.3.2	67 - 85	3	C-17 - C-19	Identifying how much to taught in an instructional hour

4. WHEN YOU HAVE COMPLETED ALL THE EXERCISES IN THIS SECTION OF THE WORKBOOK, PROCEED TO THE EXERCISES IN SECTION "B" OF THIS WORKBOOK. THERE IS NO FINAL EXERCISE FOR "C."

This exercise is designed to give you practice in assembling task analysis forms for a single Sub-Criterion in an appropriate sequence.

TURN TO NEXT PAGE FOR PROBLEMS

EXERCISE 1

Review the following illustration which represents forms collected for four Sub-STEPS which make up a Sub-Criterion behavior and collected for more detailed levels of analysis for two of the four.

Using appropriate number and number/letter designations, indicate at the bottom of the page the order in which you would assemble the forms.

Sub-STEP
#1

FORM
A.5(4)

Sub-STEP
#2

FORM
A.5(4)

2a

2b

2c

Sub-STEP
#3

FORM
A.5(4)

Sub-STEP
#4

FORM
A.5(4)

4a

4b

INDICATE YOUR SEQUENCE HERE

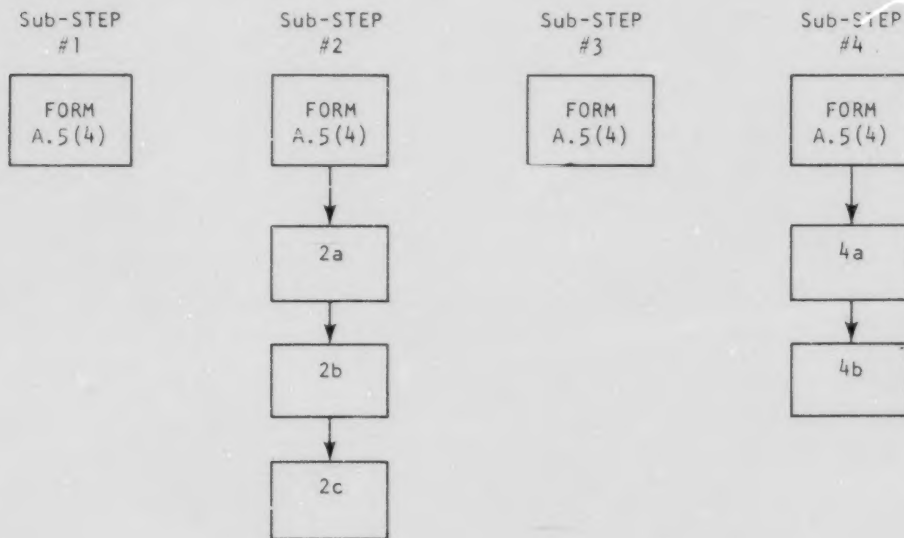
SEE ANSWERS

ANSWERS

EXERCISE 1

Review the following illustration which represents forms collected for four Sub-STEPS which make up a Sub-Criterion behavior and collected for more detailed levels of analysis for two of the four.

Using appropriate number and number/letter designations, indicate at the bottom of the page the order in which you would assemble the forms.



INDICATE YOUR SEQUENCE HERE

1 2c 2b 2a 2 3 4b 4a 4

END OF EXERCISE

Exercises 2A-2E are designed to give you practice in sequencing all (the forms for) Sub-Criterion behaviors which make up a criterion behavior.*

**Similar considerations are involved in sequencing separate criterion behaviors (covered in STEP C.2).*

TURN TO NEXT PAGE FOR PROBLEMS

EXERCISE 2A

Your task is to identify what the common element is which two Sub-Criterion behaviors share. Put an X through the shared element, #1 and #2.

	Sub-Criterion Behavior A	Sub-Criterion Behavior B	Element #1	Element #2
1.	Speaking words	Understanding spoken words	Correctly identifying the sounds of individual letters	Correctly distinguishing between the concepts of vowels and consonants
2.	Classifying types of levers	Defining mechanical advantage of levers		Distinguishing between effort force and resistance force
3.	Using the verb "to be" with personal pronouns	Using the verb "to have" with personal pronouns	Distinguishing between singular and plural personal pronouns	Distinguishing between nouns and personal pronouns
4.	Adding	Subtracting	Distinguishing between one-, two-, three-, etc., place digits	Identifying + and - signs
5.	Computing a mean	Computing a standard deviation	Associating the symbol Σ with "summation"	Distinguishing between "mean" and "standard deviation"

SEE ANSWERS

ANSWERS

EXERCISE 2A

Your task is to identify what the common element is which two Sub-Criterion behaviors share. Put an X through the shared element, #1 or #2.

	Sub-Criterion Behavior A	Sub-Criterion Behavior B	Element #1	Element #2
1.	Speaking words	Understanding spoken words	~~Correctly identifying the sounds of individual letters~~	Correctly distinguishing between the concepts of vowels and consonants
2.	Classifying types of levers	Defining mechanical advantage of levers		~~Distinguishing between effort force and resistance force~~
3.	Using the verb "to be" with personal pronouns	Using the verb "to have" with personal pronouns	~~Distinguishing between singular and plural personal pronouns~~	Distinguishing between nouns and personal pronouns
4.	Adding	Subtracting	~~Distinguishing between one-, two-, three-, etc., place digits~~	Identifying + and - signs
5.	Computing a mean	Computing a standard deviation	~~Associating the symbol $\bar{x}$ with "mean"~~	Distinguishing between "mean" and "standard deviation"

DO NEXT PROBLEM

EXERCISE 2B

Your task is to identify what the OUTPUT is from one Sub-Criterion behavior which becomes an INPUT to another Sub-Criterion behavior.

Put an X through the INPUT, #1 or #2, provided by Sub-Criterion behavior A to Sub-Criterion behavior B.

	Sub-Criterion Behavior A	Sub-Criterion Behavior B	INPUT #1	INPUT #2
1.	Computes an F-value for the significance of a difference between multiple means	Obtains a probability value from a table for the obtained difference between means	The size of the difference between the INPUT means becomes the INPUT for the ACTION taken in B	The obtained F-value becomes the INPUT for the ACTION taken in B
2.	Selects the formula for pressure ($P = \frac{f}{A}$) as suitable for a given problem	Substitutes obtained values into the formula	The formula ($P = \frac{f}{A}$) becomes the INPUT for the ACTION taken in B	The obtained values for f and A become the INPUT for ACTION taken in B
3.	Identifying the type of classroom misbehavior being exhibited	Selects a management strategy suitable to type of misbehavior	Identified type of misbehavior becomes the INPUT for the ACTION taken in B	Management strategy becomes the INPUT to ACTION taken in B
4.	Prepares a draft of a report	Edits the draft report	Editing policy becomes the INPUT for ACTION taken in B	Draft version becomes the INPUT for the ACTION taken in B
5.	Prepares an instructional strategy	Develops instructional materials	Prescription for type of prepared practice becomes the INPUT for the ACTION taken in B	Rules for preparing instructional materials become the INPUT for the ACTION taken in B

SEE ANSWERS

ANSWERS

EXERCISE 2B

Your task is to identify what the OUTPUT is from one Sub-Criterion behavior which becomes an INPUT to another Sub-Criterion behavior.

Put an X through the INPUT, #1 or #2, provided by Sub-Criterion behavior A to Sub-Criterion behavior B.

	Sub-Criterion Behavior A	Sub-Criterion Behavior B	INPUT #1	INPUT #2
1.	Computes an F-value for the significance of a difference between multiple means	Obtains a probability value from a table for the obtained difference between means	The size of the difference between means becomes the INPUT for the ACTION taken in B	~~The obtained F-value becomes the INPUT for the ACTION taken in B~~
2.	Selects the formula for pressure ($P = \frac{f}{A}$) as suitable for a given problem	Substitutes obtained values into the formula	~~The formula ($P = \frac{f}{A}$) becomes the INPUT for the ACTION taken in B~~	The obtained values for f and A become the INPUT for ACTION taken in B
3.	Identifying the type of classroom misbehavior being exhibited	Selects a management strategy suitable to type of misbehavior	~~Identified type of misbehavior becomes the INPUT for the ACTION taken in B~~	Management strategy becomes the INPUT to ACTION taken in B
4.	Prepares a draft of a report	Edits the draft report	Editing policy becomes the INPUT for ACTION taken in B	~~Draft version becomes the INPUT for the ACTION taken in B~~
5.	Prepares an instructional strategy	Develops instructional materials	~~Prescription for type of prepared practice becomes the INPUT for the ACTION taken in B~~	Rules for preparing instructional materials become the INPUT for the ACTION taken in B

DO NEXT PROBLEM

EXERCISE 2C

Your task in this exercise is to identify which of two Sub-Criterion behaviors (A or B) is a prerequisite for the other.

In the third column, write the letter (A or B) which identifies the prerequisite Sub-Criterion behavior.

	A	B	Which Is the Prerequisite Sub-Criterion Behavior
1.	Defining "pressure" as "force : area"	Defining "force"	
2.	Judging distances between cars	Parking	
3.	Identifying the subject of a sentence	Making a verb agree with the subject of a sentence	
4.	Adding	Identifying numbers	
5.	Dividing	Multiplying	

ANSWERS

EXERCISE 2C

Your task in this exercise is to identify which of two Sub-Criterion behaviors (A or B) is a prerequisite for the other.

In the third column, write the letter (A or B) which identifies the prerequisite Sub-Criterion behavior.

	A	B	Which Is the Prerequisite Sub-Criterion Behavior
1.	Defining "pressure" as "force ÷ area"	Defining "force"	B
2.	Judging distances between cars	Parking	A
3.	Identifying the subject of a sentence	Making a verb agree with the subject of a sentence	A
4.	Adding	Identifying numbers	B
5.	Dividing	Multiplying	B

DO NEXT PROBLEM

EXERCISE 2D

For each example below, indicate with an X the one or more relationships which the Sub-Criterion behaviors probably bear to one another.

	Sub-Criterion A	Sub-Criterion B	Share Elements	One Provides an INPUT to the Other	One Is a Prerequisite for the Other
1.	Sequencing sentences to make an effective paragraph	Using commas to express correct meaning in a sentence			
2.	Adding	Multiplying			
3.	Identifying type of measurement involved in using research instruments	Selecting statistical test appropriate to type of measurement used			
4.	Defining and illustrating "reinforcement"	Defining and illustrating "extinguishing"			
5.	Mixing red and yellow to get orange (the operation)	Mixing white and black to get gray (the operation)			
6.	Threading a film projector	Adjusting the focus of the projector			
7.	Selecting a formula to use to solve a problem in computing electrical resistance	Substituting obtained values into the formula			
8.	Perceiving the difference between the "f" sound and unvoiced "th" sound	Pronouncing "f" and "th" correctly			
9.	Formulating a hypothesis to account for observed problem	Proposing solution to problem			
10.	Using an English dictionary	Using a French dictionary			

ANSWERS

EXERCISE 2D

For each example below, indicate with an X the one or more relationships which the Sub-Criterion behaviors probably bear to one another.

	Sub-Criterion A	Sub-Criterion B	Share Elements	One Provides an INPUT to the Other	One Is Prerequisite for the Other
1.	Sequencing sentences to make an effective paragraph	Using commas to express correct meaning in a sentence			X
2.	Adding	Multiplying	X		X
3.	Identifying type of measurement involved in using research instruments	Selecting statistical test appropriate to type of measurement used	X	X	
4.	Defining and illustrating "reinforcement"	Defining and illustrating "extinguishing"	X		X
5.	Mixing red and yellow to get orange (the operation)	Mixing white and black to get gray (the operation)	X		
6.	Threading a film projector	Adjusting the focus of the projector		X	
7.	Selecting a formula to use to solve a problem in computing electrical resistance	Substituting obtained values into the formula	X	X	
8.	Perceiving the difference between the "f" sound and unvoiced "th" sound	Pronouncing "f" and "th" correctly			X
9.	Formulating a hypothesis to account for observed problem	Proposing solution to problem	X	X	
10.	Using an English dictionary	Using a French dictionary	X		

EXERCISE 2E

Your task in this exercise is to indicate the order in which you would sequence forms for each of the Sub-Criterion behaviors (and shared elements) listed below.

At the bottom of the page identify the sequence you would create based on the following set of conditions:

Sub-Criterion Behaviors

#1	#2	#3	#4
☐	☐	☐	☐

- All four Sub-Criterion behaviors share common elements, a, b, and c. (These elements are unrelated to one another.)
- Sub-Criterion Behavior #4 is a prerequisite for #1.
- Sub-Criterion Behavior #1 makes an INPUT to #2; and #2 makes an INPUT to #3.

INDICATE YOUR SEQUENCE HERE

SEE ANSWERS

ANSWERS

EXERCISE 2E

Your task in this exercise is to indicate the order in which you would sequence forms for each of the Sub-Criterion behaviors (and shared elements) listed below.

At the bottom of the page identify the sequence you would create based on the following set of conditions:

Sub-Criterion Behaviors

#1

#2

#3

#4

- All four Sub-Criterion behaviors share common elements, a, b, and c. (These elements are unrelated to one another.)
- Sub-Criterion Behavior #4 is a prerequisite for #1.
- Sub-Criterion Behavior #1 makes an INPUT to #2; and #2 makes an INPUT to #3.

INDICATE YOUR SEQUENCE HERE

a b c 4 1 2 3

END OF EXERCISE

This exercise is designed to give you practice in identifying how much can be practiced (learned) in an instructional hour.

TURN TO NEXT PAGE FOR PROBLEMS

EXERCISE 3

Your task in this exercise is to select from the options provided the amount of time more likely to be required to teach the Sub-Criterion behaviors represented below by the learning analysis portions of FORM A.5(4).

Sub-Criterion Behavior

#1

LEARNING ANALYSIS		DISCRIMINATIONS	
NO.	BEHAVIOR	NO.	BEHAVIOR
1	Discrimination	1	Discrimination
2	Association	2	Association
3	Generalization	3	Generalization
4	Discrimination	4	Discrimination
5	Association	5	Association
6	Generalization	6	Generalization
7	Discrimination	7	Discrimination
8	Association	8	Association
9	Generalization	9	Generalization

___ 15 minutes

___ 2 hours

Sub-Criterion Behavior

#2

LEARNING ANALYSIS		DISCRIMINATIONS	
NO.	BEHAVIOR	NO.	BEHAVIOR
1	Discrimination	1	Discrimination
2	Association	2	Association
3	Generalization	3	Generalization
4	Discrimination	4	Discrimination
5	Association	5	Association
6	Generalization	6	Generalization
7	Discrimination	7	Discrimination
8	Association	8	Association
9	Generalization	9	Generalization

LEARNING ANALYSIS		DISCRIMINATIONS	
NO.	BEHAVIOR	NO.	BEHAVIOR
1	Discrimination	1	Discrimination
2	Association	2	Association
3	Generalization	3	Generalization
4	Discrimination	4	Discrimination
5	Association	5	Association
6	Generalization	6	Generalization
7	Discrimination	7	Discrimination
8	Association	8	Association
9	Generalization	9	Generalization

LEARNING ANALYSIS		DISCRIMINATIONS	
NO.	BEHAVIOR	NO.	BEHAVIOR
1	Discrimination	1	Discrimination
2	Association	2	Association
3	Generalization	3	Generalization
4	Discrimination	4	Discrimination
5	Association	5	Association
6	Generalization	6	Generalization
7	Discrimination	7	Discrimination
8	Association	8	Association
9	Generalization	9	Generalization

___ 2 hours

___ 6 hours

SEE ANSWERS

ANSWERS

EXERCISE 3

Your task in this exercise is to select from the options provided the amount of time more likely to be required to teach the Sub-Criterion behaviors represented below by the learning analysis portions of FORM A.5(4).

Sub-Criterion Behavior

#1

LEARNING ANALYSIS		Base of difficulty in learning	
DISCRIMINATIONS			
NO	YES	NO	YES
NO	YES	☒	☐
NO	YES	☒	☐
GENERALIZATIONS			
NO	YES	NO	YES
NO	YES	☒	☐
NO	YES	☒	☐
ASSOCIATIONS			
NO	YES	NO	YES
NO	YES	☒	☐
GENERALIZATIONS			
NO	YES	NO	YES
NO	YES	☒	☐
ASSOCIATIONS			
NO	YES	NO	YES
NO	YES	☒	☐
GENERALIZATIONS			
NO	YES	NO	YES
NO	YES	☒	☐
ASSOCIATIONS			
NO	YES	NO	YES
NO	YES	☒	☐

15 minutes

X 2 hours

Sub-Criterion Behavior

#2

LEARNING ANALYSIS		Base of difficulty in learning	
DISCRIMINATIONS			
NO	YES	NO	YES
NO	YES	☒	☐
NO	YES	☒	☐
GENERALIZATIONS			
NO	YES	NO	YES
NO	YES	☒	☐
NO	YES	☒	☐
ASSOCIATIONS			
NO	YES	NO	YES
NO	YES	☒	☐
GENERALIZATIONS			
NO	YES	NO	YES
NO	YES	☒	☐
ASSOCIATIONS			
NO	YES	NO	YES
NO	YES	☒	☐
GENERALIZATIONS			
NO	YES	NO	YES
NO	YES	☒	☐

LEARNING ANALYSIS		Base of difficulty in learning	
DISCRIMINATIONS			
NO	YES	NO	YES
NO	YES	☒	☐
NO	YES	☒	☐
GENERALIZATIONS			
NO	YES	NO	YES
NO	YES	☒	☐
NO	YES	☒	☐
ASSOCIATIONS			
NO	YES	NO	YES
NO	YES	☒	☐
GENERALIZATIONS			
NO	YES	NO	YES
NO	YES	☒	☐
ASSOCIATIONS			
NO	YES	NO	YES
NO	YES	☒	☐
GENERALIZATIONS			
NO	YES	NO	YES
NO	YES	☒	☐

LEARNING ANALYSIS		Base of difficulty in learning	
DISCRIMINATIONS			
NO	YES	NO	YES
NO	YES	☒	☐
NO	YES	☒	☐
GENERALIZATIONS			
NO	YES	NO	YES
NO	YES	☒	☐
NO	YES	☒	☐
ASSOCIATIONS			
NO	YES	NO	YES
NO	YES	☒	☐
GENERALIZATIONS			
NO	YES	NO	YES
NO	YES	☒	☐
ASSOCIATIONS			
NO	YES	NO	YES
NO	YES	☒	☐
GENERALIZATIONS			
NO	YES	NO	YES
NO	YES	☒	☐

X 2 hours

6 hours

END OF EXERCISE

THERE IS NO FINAL EXERCISE
ASSOCIATED WITH VOLUME "C"
OF THE HANDBOOK.

PROCEED TO VOLUME "B"
OF THE HANDBOOK AND ITS
ASSOCIATED WORKBOOK EXERCISES.

FOLD BACK THE BLUE PAGE

FOLD OUT THIS PAGE AND
FOLLOW THE "B" SCHEDULE INSIDE

EXERCISES FOR TASK B

	After Reading HANDBOOK Sections	On HANDBOOK Pages	Do WORKBOOK Exercises	On WORKBOOK Pages	Type of Practice
1.	B.2.1	59 - 67	1A - 1B	B-1 - B-5	Selecting informants
2.	B.2.2	69 - 79	2A - 2B	B-7 - B-11	Planning how much detail to seek in describing criterion behavior
3.	B.2.3	81 - 87	3	B-13 - B-15	Determining whether repetition in analysis is necessary
4.	B.3.1 - B.3.4	89 - 131	4A - 4B	B-17 - B-26	Sub-dividing knowledge domains
5.	B.3.5	133 - 151	5A - 5F	B-27 - B-45	Identifying performance requirements for knowledge domains
6.	B.4.1 - B.4.2	153 - 201	6A - 6C	B-47 - B-57	Doing a task analysis
7.	B.4.3	203 - 209	7	B-59 - B-61	Doing more detailed task analyses
8.	B.4.4	211 - 231	8A - 8E	B-63 - B-75	Doing a learning analysis
9.	B.4.5	233 - 245	9	B-77 - B-79	Doing a competency (performance) analysis
10.	B.5.1	247 - 265	10	B-81 - B-89	Doing a mode analysis
11.	B.1.1 - B.1.5	1 - 57	---	---	Collecting descriptions about critical elements of criterion behavior

12. WHEN YOU HAVE COMPLETED ALL THE EXERCISES IN THIS SECTION OF THE WORKBOOK,
PROCEED TO FINAL EXERCISES #7 AND #8 IN THE FINAL EXERCISES VOLUME.

After reading
Handbook for
sub STEP(S)

B.2.1

DO
EXERCISE

1

This exercise is designed to give you practice in recognizing when it is appropriate to rely on one expert as an informant for all the types of analyses which must be performed and when it is important to seek the expertise of more than one expert.

TURN PAGE FOR PROBLEMS

EXERCISE 1A

Read the description of the instructional development requirements and of the qualifications of an available informant.

Indicate your judgment of the suitability of the available informant by checking the appropriate option.

1. You are going to prepare a handbook to teach people how bodily functions are improved as a result of eating organically grown food.

Mr. Bailey has been running an organic farm for twenty-five years and publishes a journal on how to grow organic food.

Mr. Bailey is:

- ☐ a. An unsuitable informant
- ☐ b. Suitable for obtaining task description information
- ☐ c. Suitable for obtaining information useful in conducting a task description, task analysis, learning analysis, and audience analysis.

2. Your task is to train inner-city disadvantaged youth in techniques to use on job interviews.

Miss Miller conducts an orientation class for disadvantaged youth who are poor and come from rural non-farm areas. She prepares them to conduct themselves properly during a job interview by instructing them on how to dress for an interview, how to respond to questions about themselves, and general techniques to use during a job interview.

Miss Miller is unsuitable as an informant for obtaining information which could be useful in performing:

- ☐ A task description
- ☐ A task analysis
- ☐ A learning analysis
- ☐ An audience analysis

SEE ANSWERS

ANSWERS

EXERCISE 1A

Read the description of the instructional development requirements and of the qualifications of an available informant.

Indicate your judgment of the suitability of the available informant by checking the appropriate option.

1. You are going to prepare a handbook to teach people how bodily functions are improved as a result of eating organically grown food.

Mr. Bailey has been running an organic farm for twenty-five years and publishes a journal on how to grow organic food.

Mr. Bailey is:

- ☒ a. An unsuitable informant
- ☐ b. Suitable for obtaining task description information
- ☐ c. Suitable for obtaining information useful in conducting a task description, task analysis, learning analysis, and audience analysis

2. Your task is to train inner-city disadvantaged youth in techniques to use on job interviews.

Miss Miller conducts an orientation class for disadvantaged youth who are poor and come from rural non-farm areas. She prepares them to conduct themselves properly during a job interview by instructing them on how to dress for an interview, how to respond to questions about themselves, and general techniques to use during a job interview.

Miss Miller is unsuitable as an informant for obtaining information which could be useful in performing:

- ☐ A task description
- ☐ A task analysis
- ☐ A learning analysis
- ☒ An audience analysis

DO NEXT PROBLEM

EXERCISE 1B

Read the description of the type of criterion behavior to be analyzed and of the qualifications of an available informant.

Indicate by checking the appropriate box whether you would rely on the one expert or whether you would also seek additional experts.

Use One
Expert

Use More
Than One
Expert

Criterion Behavior		Available Informant				
1.	Delivery of post-natal care to patients	A head nurse has had experience in delivering post-natal care				
2.	Providing vocational rehabilitation counseling to disabled people	A trainer with ten years' experience training others to provide vocational rehabilitation counseling				
3.	Designing curriculum materials for fourth grade math students	Curriculum specialist in elementary school mathematics with teaching experience				
4.	Terminal behaviors involving basic bio-chemistry concepts and principles for 12th graders	A Ph.D. bio-chemist who has taught chemistry at the graduate level				
5.	Performing heart surgery	Cardiologist who has gone directly from a residency into private practice				

SEE ANSWERS

ANSWERS

EXERCISE 1B

Read the description of the type of criterion behavior to be analyzed and of the qualifications of an available informant.

Indicate by checking the appropriate box whether you would rely on the one expert or whether you would also seek additional experts.

Use One
Expert

Use More
Than One
Expert

	Criterion Behavior	Available Informant		
			Use One Expert	Use More Than One Expert
1.	Delivery of post-natal care to patients	A head nurse has had experience in delivering post-natal care		✓
2.	Providing vocational rehabilitation counselling to disabled people	A trainer with ten years' experience training others to provide vocational rehabilitation counselling	✓	
3.	Designing curriculum materials for fourth grade math students	Curriculum specialist in elementary school mathematics with teaching experience	✓	
4.	Terminal behaviors involving basic bio-chemistry concepts and principles for 12th graders	A Ph.D. bio-chemist who has taught chemistry at the graduate level		✓
5.	Performing heart surgery	Cardiologist who has gone directly from a residency into private practice		✓

END OF EXERCISE

Exercise 2A is designed to give you practice in distinguishing between contingent and non-contingent tasks.

Exercise 2B is designed to give you practice in deciding whether to organize information collection about performance at broad levels of detail or at relatively specific levels of detail.

TURN TO NEXT PAGE FOR PROBLEMS

EXERCISE 2A

In each of the following pairs of tasks described below, one is "contingent," and the other is "non-contingent." Put an X through the task you think is an example of a contingent performance.

	TASK 1	TASK 2
1.	Comparing and contrasting classical and romantic music	Listing the properties of classical music
2.	Coding a document in three unrelated ways; analyze for: direct code, indirect code, and superimposed code	Using a library: search through card catalog; identify document number; and retrieve document from shelf
3.	Preparing a wet mount: clean slides and cover slips; place drop of water on slide; place sample on drop of water	Evaluating structure of a paragraph by checking for: a topic sentence; coherent arrangement of detail; and a concluding statement
4.	Labeling parts of a microscope	Performing long division
5.	Rating a public speaker on: appearance, platform deportment, and effectiveness	Disassembling and cleaning a movie projector

SEE ANSWERS

ANSWERS

EXERCISE 2A

In each of the following pairs of tasks described below, one is "contingent," and the other is "non-contingent." Put an X through the task you think is an example of a contingent performance.

TASK 1

1. ~~Comparing and contrasting classical and romantic music~~

2. Coding a document in three unrelated ways; analyze for: direct code, indirect code, and superimposed code

3. ~~Preparing a wet mount: clean slides and cover slips; place drop of water on slide; place sample on drop of water~~

4. Labeling parts of a microscope

5. Rating a public speaker on: appearance, platform deportment, and effectiveness

TASK 2

Listing the properties of classical music

~~Using a library: search through card catalog; identify document number; and retrieve document from shelf~~

Evaluating structure of a paragraph by checking for: a topic sentence; coherent arrangement of detail; and a concluding statement

~~Performing long division~~

~~Disassembling and cleaning a movie projector~~

DO NEXT PROBLEM

EXERCISE 2B

Read the performance descriptions and then indicate by putting an X in the appropriate column whether information should at the outset be collected at a broad or at a specific level of detail.

PERFORMANCE DESCRIPTION		Information Collection at: Broad Level Specific Level	
1.	Cutting holes in metal: setting drill press for slow speed; and stopping and checking speed two or three times to obtain correct size		
2.	Doing Inductive writing (e.g., correctly alluding to given facts; observing grammatical conventions; and incorporating conclusion based on facts)		
3.	Conducting a literature search		
4.	Identifying characteristics of food processing method: canning, salting, smoking, drying, and dehydrating		
5.	Writing the plural forms of singular nouns		

ANSWERS

EXERCISE 2B

Read the performance descriptions and then indicate by putting an X in the appropriate column whether information should at the outset be collected at a broad or at a specific level of detail.

PERFORMANCE DESCRIPTION	Information Collection at:	
	Broad Level	Specific Level
1. Cutting holes in metal: setting drill press for slow speed; and stopping and checking speed two or three times to obtain correct size		X
2. Doing inductive writing (e.g., correctly alluding to given facts; observing grammatical conventions; and incorporating conclusion based on facts)	X	
3. Conducting a literature search	X	
4. Identifying characteristics of food processing method: canning, salting, smoking, drying, and dehydrating	X	
5. Writing the plural forms of singular nouns		X

This exercise is designed to give you practice in identifying situations in which it is or is not necessary to repeat analyses once you have done an initial one. Your decision will be based on whether either the MODE or the SKILLS involved in the criterion behavior throughout the range of examples the performer is likely to encounter are essentially identical to those already analyzed in an initial set of examples.

TURN TO NEXT PAGE FOR PROBLEMS

EXERCISE 3

For each example below indicate by checking two boxes below whether MODE and SKILLS involved in the whole range of criterion behaviors to be analyzed are repetitive or non-repetitive.

R = repetitive

NON-R = non-repetitive

*You have already analyzed the mode and skills involved in:		MODE		SKILLS	
		R	NON-R	R	NON-R
1.	Doing addition and subtraction problems; other specific addition or subtraction problems involve:	☒	☐	☐	☐
2.	Using reinforcement to strengthen adaptive classroom behavior; another performance is extinguishing non-adaptive behavior, which involves:	☐	☐	☐	☐
3.	A secretary taking dictation; other examples of taking dictation involve:	☐	☐	☐	☐
4.	<u>Discussing</u> the application of a theory to physical phenomena; other behavior to be taught is performing experiments which involve:	☐	☐	☐	☐
5.	Oral use of rules relating to singular and plural nouns and forms of verbs; other behavior to be taught is writing using the same rules, which involves:	☐	☐	☐	☐
6.	Writing the "method" section of a research report; other behavior consists of writing the "results" and "discussion" sections, which involves:	☐	☐	☐	☐
7.	Providing examples of a social science concept; other behaviors consist of providing examples of other concepts--which involves:	☐	☐	☐	☐
8.	<u>Paraphrasing</u> received definitions of philosophical concepts; other behaviors consist of <u>comparing</u> and <u>contrasting</u> concepts which involves:	☐	☐	☐	☐
9.	Sight-reading piano music (for Chopin); other behavior sight-reading (for Berg), which involves:	☐	☐	☐	☐
10.	Stating objectives in the instructional materials development process; other behavior--constructing verbal tests, which involves:	☐	☐	☐	☐

ANSWERS

EXERCISE 3

For each example below indicate by checking two boxes below whether MODE and SKILLS involved in the whole range of criterion behaviors to be analyzed are repetitive or non-repetitive.

R = repetitive

NON-R = non-repetitive

		MODE		SKILLS	
*You have already analyzed the mode and skills involved in:		R	NON-R	R	NON-R
1.	Doing addition and subtraction problems; other specific addition or subtraction problems involve:	✓		✓	
2.	Using reinforcement to strengthen adaptive classroom behavior; another performance is extinguishing non-adaptive behavior, which involves:		✓		✓
3.	A secretary taking dictation; other examples of taking dictation involve:	✓		✓	
4.	Discussing the application of a theory to physical phenomena; other behavior to be taught is performing experiments which involve:		✓		✓
5.	Oral use of rules relating to singular and plural nouns and forms of verbs; other behavior to be taught is writing using the same rules, which involves:		✓	✓	
6.	Writing the "method" section of a research report; other behavior consists of writing the "results" and "discussion" sections, which involves:	✓			✓
7.	Providing examples of a social science concept; other behaviors consist of providing examples of other concepts--which involves:	✓		✓	
8.	Paraphrasing received definitions of philosophical concepts; other behaviors consist of <u>comparing</u> and <u>contrasting</u> concepts which involves:	✓			✓
9.	Sight-reading piano music (for Chopin); other behavior sight-reading (for Berg), which involves:	✓		✓	
10.	Stating objectives in the instructional materials development process; other behavior--constructing verbal tests, which involves:	✓			✓

This exercise is designed to give you practice sub-dividing "knowledge domains" into areas, topics, and sub-topics. When you have completed this exercise, you will be able to record on FORM A.5(8) "task description" results for knowledge domains at differing levels of generality.

Below is an illustrative example of FORM A.5(8) completed for the areas: "magnetism" and "electricity." Your products in this exercise will look like this example.

Form A.5 (8)

FOR SUMMARY OF

AREAS
TOPICS

A. Magnetism

A.1 The nature of magnets

A.6 How magnets are made

A.2 Law of magnetic attraction

A.7 How magnets lose their magnetism

A.3 The magnetic field

A.8 The earth as a magnet

A.4 The force of a magnet

A.9 The uses of magnets

A.5 Theories of magnetism

B. Electromagnets

B.1 Magnetism can be obtained from electricity

B.2 How an electromagnet is made

B.3 Making electromagnets stronger

B.4 Similarities and differences in magnets and electromagnets

B.5 Uses of electromagnets

FOLD OUT THIS PAGE

EXERCISE 4A

An interview between an informant and a training analyst is presented below. Learning material on geology is to be prepared for sixth grade science students.

Read the interview results, and then fill in Form A.5(8) which appears on pages 18a and 19. Be sure to label areas and topics using letters and numbers.

Interview Between Informant and Training Analyst

Training Analyst: We need a big picture or an overview of the major areas covered in your geology course. What are the major areas you cover?

Here's an example of what I mean from another subject. For example, if I were teaching a course on the human body, some major areas would be the skeletal system, the digestive system, the vascular system, etc.

Informant: The course is divided into three broad categories. First, I teach the composition of the earth; then, I talk about forces that shape and change the earth's surface; finally, there's something I call the history of the earth, which is really about the various stages of the earth's development.

Training Analyst: Now, let's go back and identify the major topics within each area just listed. Using the example of the human body again, if the sense organs were a major area, major topics within it would be: the skin, the nose, the eyes, and so on. What are the major topics under "composition of the earth"?

Informant: Well, I begin with how the earth was formed because that seems a good way to begin. Next, we study the layers of the earth; that is, the crust, mantle, and core. I spend a great deal of time on rocks and minerals. I would say they are actually two sub-topics--Rocks constitute one, and minerals the other.

Training Analyst: What are the major topics under "forces that shape and change the earth's surface"?

Informant: That's a big part of the course. I begin with the fact that the solid parts of the earth can move and present various theories of why they move. Other topics are folding and faulting, earthquakes, mountains, plains and plateaus, volcanoes, and hot springs and geysers. That's it.

Training Analyst: O.K. What are the major topics in "history of the earth"?

Informant: Three major topics which are related are: (1) how geologists study the earth; (2) how geologists calculate the age of the earth; and (3) the geologic timetable. Once I've covered that ground, I go into the Cenozoic Era, the Mesozoic Era, the Paleozoic Era, the Archeozoic Era, and the Azoic Era. I would consider each era a major topic.

SEE ANSWERS

A. Composition of the earth

A.1 How the earth was formed

A.2 Layers of the earth

A.3 Rocks

A.4 Minerals

B. Forces that shape and change the earth's surfaces

B.1 How movement of solid parts
of the earth occurs and why

B.2 Folding and faulting

B.3 Earthquakes

B.4 Mountains

B.5 Plains and plateaus

B.6 Volcanoes

B.7 Hot springs and geysers

C. History of the earth

C.1 How geologists study the earth

C.6 The Paleozoic Era

C.2 Calculating the age of the earth

C.7 The Archeozoic Era

C.3 The geologic timetable

C.8 The Azoic Era

C.4 The Cenozoic Era

C.5 The Mesozoic Era

EXERCISE 4B

Exercise 4B is designed to give you practice sub-dividing topics into sub-topics. When you have completed this exercise, you will know how to record sub-topics in the knowledge domain on FORM A.5(9).

Below is an example of FORM A.5(9) with sub-topics completed for two topics under the major area, magnetism.

Form A.5 (9)	for AREA	A	TOPIC	1, 2	FOR SUMMARY OF	Sub TOPICS

A.1 Nature of magnets	
A.1.1 Definition of a magnet	
A.1.2 Natural magnets	
A.1.3 Man-made magnets	
A.2 Law of magnetic attraction	
A.2.1 Identifying the different forces of a magnet	
A.2.2 The result of different forces	

FOLD OUT THIS PAGE

B-22 /
8-23

EXERCISE 4B

Now that you've completed Form A.5(8), your task is to complete Form A.5(9). Transcribe all necessary information from Form A.5(8) to A.5(9) and label accordingly. Then read the continuation of the interview (See below) and complete Form A.5(9) based on it.

Form A.5(9) FOR SUMMARY OF AREAS TOPICS

A. COMPOSITION OF THE EARTH	
A.1 How the earth was formed	
A.2 Layers of the earth	
A.3 Rocks	
A.4 Minerals	
B. FORCES THAT SHAPE AND CHANGE THE EARTH'S SURFACE	
B.1 How movement of solid parts of the earth occurs and why	B.6 Volcanoes
B.2 Folding and faulting	B.7 Hot springs and geysers
B.3 Earthquakes	
B.4 Weathering	
B.5 PLAINS AND PLATEAUS	

Training Analyst: Now, let's take each topic and identify the sub-topics within it.

First, let me transcribe the major topics onto this new form.

Now, what are the sub-topics treated in the topic "how the earth was formed"?

Informant: I present this material chronologically. There's formation of the earth from white hot gases; cooling of the earth; formation of the earth's crust; formation of clouds around the earth; formation of bodies of water; formation of the earth's atmosphere.

Form A-5 (9)

for AREA

TOPIC

FOR SUMMARY OF

Sub-TOPICS

SEE ANSWERS

ANSWERS

Form A-5 (9)

for AREA

A

TOPIC

A.1, A.2

FOR SUMMARY OF

Sub-TOPICS

A.1 How the earth was formed

A.1.1 Formation of the earth
from white hot gases

A.1.6 Formation of the earth's
atmosphere

A.1.2 Cooling of the earth

A.1.3 Formation of the earth's
crust

A.1.4 Formation of clouds
around the earth

A.1.5 Formation of bodies of
water

A.2 Layers of the earth

The training analyst would continue to ask the same type of questions to
elicit all sub-topics within each topic previously identified.

FOLD BACK PAGE B-23

END OF EXERCISE

Exercises 5A-5F are designed to give you the following types of practice involving "knowledge domain" terminal behaviors.

- 5A. Identifying specific INPUTS and INPUT classes
- 5B. Identifying when members belonging to an INPUT class are new or old
- 5C. Identifying when terminal behaviors involve RECALL or TRANSFER
- 5D. Classifying terminal behaviors for competency levels
- 5E. Identifying adequacy of descriptions of terminal behaviors
- 5F. Collecting information about terminal behaviors

TURN TO NEXT PAGE FOR PROBLEMS

EXERCISE 5A

In each problem below one column contains an example which is a specific INPUT; the other contains an example of a member of an INPUT class.

Write in the letter in the appropriate column indicating which example is a specific INPUT and which is a member of an INPUT class.

	A	B	Specific an INPUT	Class
1.	-The label to be attached to the INPUT example is: "gorilla" -The INPUT example is: any gorilla	-The label to be attached to the INPUT example is: "King Kong" -The INPUT example is: King Kong		
2.	-The label to be attached to the INPUT example is: "a city" -The INPUT example is: San Diego	-The label to be attached to the INPUT example is: "San Diego" -The INPUT example is: a dot on the map indicating San Diego		
3.	-The label to be attached to the INPUT example is: "Ohm's Law" -The INPUT example is: $I = \frac{V}{R}$	-The label to be attached to the INPUT class is: "a law in physics" -The INPUT example is: $I = \frac{V}{R}$		
4.	-The label to be attached to the INPUT example is: "Macy's" -The INPUT example is: Macy's	-The label to be attached to the INPUT example is: "department store" -The INPUT example is: Macy's		
5.	-The label to be attached to the INPUT example is: "27" -The INPUT example is: 3 x 7	-The label to be attached to the INPUT example is: "a problem in multiplication" -The INPUT example is: 3 x 7		

SEE ANSWERS

ANSWERS

EXERCISE 5A

In each problem below one column contains an example which is a specific INPUT; the other contains an example of a member of an INPUT class.

Write in the letter in the appropriate column indicating which example is a specific INPUT and which is a member of an INPUT class.

	A	B	Specific an INPUT	Member of INPUT Class
1.	-The label to be attached to the INPUT example is: "gorilla" -The INPUT example is: any gorilla	-The label to be attached to the INPUT example is: "King Kong" -The INPUT example is: King Kong	B	A
2.	-The label to be attached to the INPUT example is: "a city" -The INPUT example is: San Diego	-The label to be attached to the INPUT example is: "San Diego" -The INPUT example is: a dot on the map indicating San Diego	B	A
3.	-The label to be attached to the INPUT example is: "Ohm's Law" -The INPUT example is: $I = \frac{V}{R}$	-The label to be attached to the INPUT class is: "a law in physics" -The INPUT example is: $I = \frac{V}{R}$	A	B
4.	-The label to be attached to the INPUT example is: "Macy's" -The INPUT example is: Macy's	-The label to be attached to the INPUT example is: "department store" -The INPUT example is: Macy's	A	B
5.	-The label to be attached to the INPUT example is: "27" -The INPUT example is: 3 X 7	-The label to be attached to the INPUT example is: "a problem in multiplication" -The INPUT example is: 3 X 7	A	B

DO NEXT PROBLEM

EXERCISE 5B

For each problem below put an X in the appropriate column indicating whether the INPUT used in a TEST is a new or old example of the class described.

1.	Criterion Behavior	Practice During Training		Example of INPUTS In a TEST	Old	New
		Involves These Examples				
	To identify data classified by name or label as "nominal data"	"Occupation" "Gender" "Marital status"		"Place of birth"		
2.	To identify right angle triangles					
3.	To use (or not use) commas for "restrictive" clauses and "non- restrictive" clauses	A man who is very short cannot serve in the army. A man who is very short spoke to us today.	A man who is very short spoke to us today			
4.	To expand the binomial theorem	$(x + y)^n$ $(x + y)^3$ $(x + y)^5$	$(x + y)^4$ $(x + y)^7$			
5.	To use the proper present tense of verbs for singular and plural pronouns	I, you, he, she, it, we, and they walk(s) run(s)	I, you, he, she, it, we, and they talk(s) help(s)			

SEE ANSWERS

ANSWERS

EXERCISE 58

For each problem below put an X in the appropriate column indicating whether the INPUT used in a TEST is a new or old example of the class described.

Criterion Behavior	Practice During Training Involves These Examples		Example of INPUTS in a TEST		Old	New
1. To identify data classified by name or label as "nominal data"	"Occupation" "Gender" "Marital status"		"Place of birth"			X
2. To identify right angle triangles						X
3. To use (or not use) commas for "restrictive" clauses and "non-restrictive" clauses	A man who is very short cannot serve in the army A man who is very short spoke to us today.		A man who is very short spoke to us today		X	
4. To expand the binomial theorem		$(x + y)^n$ $(x + y)^3$ $(x + y)^5$	$(x + y)^4$ $(x + y)^7$			X
5. To use the proper present tense of verbs for singular and plural pronouns		I, you, he, she, it, we, and they walk(s) run(s) talk(s) help(s)	I, you, he, she, it, we, and they walk(s) run(s) talk(s) help(s)		X	

DO NEXT PROBLEM

EXERCISE 5C

Read each of the examples below and put an X in the appropriate column indicating whether performance on a TEST is likely to require RECALL or TRANSFER

In a Test Situation:		Likely to Require:	
		RECALL	TRANSFER
1.	An art student has to indicate what the primary colors are, i.e., red, yellow, and blue		
2.	An art student has to identify any example of painting, sculpture, or architecture which is classified by historians as Baroque		
3.	The English student has to use "am" every time he uses "I," "are" for "you," and "is" for "he," "she," or "it"		
4.	A literature student must identify any example of a metaphor he comes across		
5.	The instructional developer has to prepare test items appropriate to the subject matter he is teaching		

ANSWERS

EXERCISE 5C

Read each of the examples below and put an X in the appropriate column indicating whether performance on a TEST is likely to require RECALL or TRANSFER.

In a Test Situation:		Likely to Require:	
		RECALL	TRANSFER
1.	An art student has to indicate what the primary colors are, i.e., red, yellow, and blue	X	
2.	An art student has to identify any example of painting, sculpture, or architecture which is classified by historians as Baroque		X
3.	The English student has to use "am" every time he uses "I," "are" for "you," and "is" for "he," "she," or "it"	X	
4.	A literature student must identify any example of a metaphor he comes across		X
5.	The instructional developer has to prepare test items appropriate to the subject matter he is teaching		X

This exercise is designed to give you practice in classifying terminal behaviors at the four levels of competency.

FOLD OUT THIS PAGE

For AREA

TOPIC

Sub-TOPIC

FOUR COMPETENCY LEVELS

IV

INPUT TRANSFER + ACTION TRANSFER

new example of input $\rightarrow$ new example of action/chain

new example of input $\leftarrow$ action/chain

III

INPUT TRANSFER + ACTION RECALL

new example of input $\rightarrow$ specific

new example of input $\leftarrow$ action/chain

II

INPUT RECALL + ACTION TRANSFER

specific input $\rightarrow$ new example of action/chain

specific input $\leftarrow$ action/chain

old example of input $\rightarrow$ new example of action/chain

old example of input $\leftarrow$ action/chain

I

INPUT RECALL + ACTION RECALL

specific input $\rightarrow$ specific

specific input $\leftarrow$ action/chain

old example of input $\rightarrow$ specific

old example of input $\leftarrow$ action/chain

EXERCISE 5D

Read the examples of terminal behaviors below and indicate at which competency level you would classify each. Refer to the fold out for the definition of levels.

DURING INSTRUCTION the Student Practices:		ON A TEST				COMPETENCY LEVEL I II III IV			
1.	Identifying on a picture of a thermometer (by inserting arrows) where the boiling point and freezing point are	The student makes the identical types of identification							
2.	Classifies cities (like Boston, Chicago, New Orleans, Phoenix) as being suitable or unsuitable transportation centers and lists their properties which qualify them as one or the other	The student classifies and provides a supporting list of properties for the cities: Baltimore, San Francisco, Reno, and Asheville							
3.	Stating the properties and advantages of using a particular learning taxonomy (e.g., Bloom's)	Presented with a taxonomy formulated by Gagne, compares and contrasts it with the Bloom taxonomy							
4.	Defining the concept "conduction"	Provides examples of the concept and contrasts it with "convection"							

SEE ANSWERS

ANSWERS

EXERCISE 5D

Read the examples of terminal behaviors below and indicate at which competency level you would classify each. Refer to the fold out for the definition of levels.

COMPETENCY LEVEL
I II III IV

ON A TEST

DURING INSTRUCTION
the Student Practices:

1. Identifying on a picture of a thermometer (by inserting arrows) where the boiling point and freezing point are	The student makes the identical types of identification	X			
2. Classifies cities (like Boston, Chicago, New Orleans, Phoenix) as being suitable or unsuitable transportation centers and lists their properties which qualify them as one or the other	The student classifies and provides a supporting list of properties for the cities: Baltimore, San Francisco, Reno, and Asheville		X		
3. Stating the properties and advantages of using a particular learning taxonomy (e.g., Bloom's)	Presented with a taxonomy formulated by Gagne, compares and contrasts it with the Bloom taxonomy			X	
4. Defining the concept "conduction"	Provides examples of the concept and contrasts it with "convection"		X		

FOLD BACK PAGE B-35

DO NEXT PROBLEM

EXERCISE 5E

For each of the five problems below, put an X through the one description among the three presented that you think is the most objective and complete.

C The Student Will		
Label pictorially presented examples of levers (without error) as belonging to Class I, II, or III	Know how to describe nutrients and their functions	Identify a land form when given a verbal description or shown a pictorial representation of it
In criterion fashion, explain the relationship among elements in a periodic table	Know how to add quickly using a ten key adding machine	

B The Student Will		
Identify the class to which pictorially presented levers belong	Be able to identify the functions of nutrients	Identify and name various types of land forms
Without the aid of a periodic table in front of him, list the differences in numbers of electrons and in atomic weight of six elements	Solve addition problems within twenty-five seconds using a ten key adding machine	

A The Student Will		
1. Know what the properties are which determine the classification of a lever	2. Match nutrients and their functions when given a list of each	3. Produce the name commonly associated with a land form when given a verbal description or shown a pictorial representation of it
4. Without assistance, contrast six elements in the periodic table	5. Solve addition problems within a specified period of time using a ten key adding machine	

B-38

SEE ANSWERS

ANSWERS

EXERCISE 5E

For each of the five problems below, put an X through the one description among the three presented that you think is the most objective and complete.

A The Student Will			B The Student Will			C The Student Will		
1.	Know what the properties are which determine the classification of a lever		Identify the class to which pictorially presented levers belong		~~Label pictorially presented examples of levers (without error) as belonging to Class I, II, or III~~			
2.	~~Match nutrients and their functions when given a list of each~~		Be able to identify the functions of nutrients				Know how to describe nutrients and their functions	
3.	~~Produce the name commonly associated with a land form when given a verbal description or shown a pictorial representation of it~~		Identify and name various types of land forms				Identify a land form when given a verbal description or shown a pictorial representation of it	
4.	Without assistance, contrast six elements in the periodic table		~~Without the aid of a periodic table in front of him, list the differences in numbers of electrons and in atomic weights of six elements~~				In criterion fashion, explain the relationship among elements in a periodic table	
5.	Solve addition problems within a specified period of time using a ten key adding machine		~~Solve addition problems within twenty-five seconds using a ten key adding machine~~				Know how to add quickly using a ten key adding machine	

DO NEXT PROBLEM

EXERCISE 5F

This exercise is designed to give you practice in recording descriptions of terminal behaviors on FORM A.5(10).

Below is an example of FORM A.5(10) completed for Area A, Topic 1, Sub-Topic 2 of the subject matter, "magnetism and electromagnets," used in an earlier exercise. *NOW, TURN THE PAGE.*

Form A.5(10)

For AREA A

TOPIC I

Sub-TOPIC 2

FOUR COMPETENCY LEVELS

IV	INPUT TRANSFER + ACTION TRANSFER new example of input <u>class</u> → new example of action chain <u>class</u>	Sub-TOPIC 2 is "natural magnets" -When presented with examples of "natural magnets," either those identified during instruction or new ones, can respond in a variety of ways (a variety of ACTIONS): --Labels them properly --Lists their properties --Compares them with other natural magnets
III	INPUT TRANSFER + ACTION RECALL new example of input <u>class</u> → specific action chain	-When presented with examples not used in instruction, is able to classify them as natural magnets (the specific ACTION practiced during instruction)
II	INPUT RECALL + ACTION TRANSFER specific input → new example of action chain <u>class</u> old example of input <u>class</u> → new example of action chain <u>class</u>	
I	INPUT RECALL + ACTION RECALL specific input → specific action chain old example of input <u>class</u> → specific action chain	

EXERCISE 5F

Your task in this exercise is to fill out FORM A.5(10) for the subject matter "the earth" used in previous exercises. For the purposes of this exercise you will complete FORM A.5(10) for only one sub-topic, A.1.5 (formation of bodies of water), indicated below by a check mark.

SEE OPPOSITE PAGE FOR INSTRUCTIONS.

Form A.5(10)		FOR SUMMARY OF		AREA TOPIC
A. FORMATION OF THE EARTH				
A.1. How the earth was formed				
A.2. Layers of the earth				
A.3. Rocks				
A.4. Mountains				
B. Forces that move and change the earth's surface				
A.5. How movement in solid earth is the earth's oceans and air		B.6. Volcanoes		
A.6. Rivers and glaciers		B.7. Wind, waves and currents		
A.7. Earthquakes				
A.8. Mountains				
A.9. Oceans and waterways				

Form A.5(10)		FOR SUMMARY OF		AREA TOPIC
A. FORMATION OF THE EARTH				
A.1. How the earth was formed				
A.1.1. Formation of the water from water and gases		A.1.2. Formation of the earth's atmosphere		
A.1.3. Cooling of the earth				
A.1.4. Formation of the earth's crust				
A.1.5. Formation of clouds around the earth				
A.1.6. Formation of bodies of water				
A.2. Layers of the earth				

FOLD OUT THIS PAGE

Read the continuation of the interview from which the information contained on the forms on the opposite page was obtained. Record information obtained from the informant onto FORM A.5(10) in the appropriate space (i.e., at the appropriate competency level). Be sure to continue your labeling system.

EXERCISE 5F

Training Analyst: Now, for each of the sub-topics, let's identify how the learner is expected to exhibit the fact that he has learned the facts, concepts, or principles involved. For example, after having learned a concept, will he be expected to define it verbatim, or will he be expected to give an example of the concept covered during instruction, or will he be expected to give a new example?

The analyst would begin with Sub-Topic A.1.1, "formation of the earth from white hot gases," and continue through the sequence for each sub-topic. We enter the interview at Sub-Topic A.1.5.

Let's take the sub-topic, "formation of bodies of water." What are the terms, concepts, facts, or principles you want the learner to learn?

Informant: I want him to learn the process by which bodies of water were formed. That process is that as rain fell causing the earth's crust to cool, some of the water, instead of evaporating, trickled down rocks to form small pools on the earth's surface. These were the beginning of the earth's lakes and oceans. For a long time it rained constantly, filling the earth's surface with bodies of water.

Training Analyst: For the process you mentioned, what kind of mastery do you expect?

Informant: Oh, just to be able to explain the process in the student's own words. On a test I might ask, "Describe how the earth's lakes and oceans were formed." The child would then paraphrase the description of the process learned during instruction.

For AREA

TOPIC

Sub-TOPIC

FOUR COMPETENCY LEVELS

IV	INPUT TRANSFER + ACTION TRANSFER	
	new example of input $\rightarrow$ new example of action/chain $\leftarrow$	
III	INPUT TRANSFER + ACTION RECALL	
	new example of input $\rightarrow$ specific $\leftarrow$ action/chain	
II	INPUT RECALL + ACTION TRANSFER	
	$\overline{\text{specific}}$ input $\rightarrow$ new example of action/chain $\leftarrow$ old example of input $\rightarrow$ new example of action/chain $\leftarrow$	
I	INPUT RECALL + ACTION RECALL	
	specific input $\rightarrow$ specific action/chain $\leftarrow$ old example of input $\rightarrow$ specific action/chain $\leftarrow$	

ANSWERS

For AREA

TOPIC

Sub-TOPIC

FOUR COMPETENCY LEVELS

IV

INPUT
TRANSFER + ACTION
TRANSFER

new example of $\longrightarrow$ new example of
input class $\longleftarrow$ action/chain class

III

INPUT
TRANSFER + ACTION
RECALL

new example of $\longrightarrow$ specific
input class $\longleftarrow$ action/chain

II

INPUT
RECALL + ACTION
TRANSFER

specific input $\longrightarrow$ new example of
 $\longleftarrow$ action/chain class

old example of $\longrightarrow$ new example of
input class $\longleftarrow$ action/chain class

I

INPUT
RECALL + ACTION
RECALL

specific input $\longrightarrow$ specific
 $\longleftarrow$ action/chain

old example of $\longrightarrow$ specific
input class $\longleftarrow$ action/chain

Sub-Topic 5 is "formation of bodies of water"

-When asked to describe how bodies of water were formed, a question used in instruction, the student will state in his own words (paraphrase) the process described during instruction

FOLD BACK PAGE B-43

END OF EXERCISE

This exercise has three parts: 6A, 6B, and 6C. All are designed to give you practice in diagramming task analysis results either on FORM A.5(4) for "performance" Sub-STEPS or on FORM A.5(11) for "knowledge domain" terminal behaviors.

FOLD OUT THIS PAGE

EXERCISE 6A

This exercise is designed to give you practice in diagramming just INPUTS on task analysis forms.

Below are interview results for a performance Sub-STEP and for a knowledge domain terminal behavior.

1. Read the examples below and fill in the INPUT blocks (only) on the appropriate forms, either Form A.5(4) or (11), on the adjacent page.
2. Fill in both task description blocks at the top of the form (a) and the task analysis blocks on the lower portion of the form (b).
3. Make sure the diagramming for task description and task analysis is cross-referenced.

Knowledge Domain Example

The student must be able to discriminate between igneous rock formed from magma that reached the earth's surface as extrusive rock and igneous rock formed from magma that did not reach the earth's surface as intrusive rock.

Performance Example

In order to be able to do multiplication and division on a full-key adding machine, a student must make discriminations between problem types, i.e., division problems and multiplication problems. The student must also generalize across such types of division problems as: whole numbers without remainders, whole numbers with remainders, and decimal problems with remainders; and must generalize across such multiplication problems as: simple multiplication, accumulative multiplication, and three factor multiplication.

Form A-5 (4)

For TASK STEP SUB STEP TASK DESCRIPTION

INPUT	ACTION	OUTPUT
D. TASK ANALYSIS		

Form A-5 (11)

For AREA TOPIC SUB TOPIC BEHAVIOR TASK DESCRIPTION

INPUT	ACTION	OUTPUT
D. TASK ANALYSIS		

SEE ANSWERS

ANSWERS

Form A-5 (4)

NO. TASK	STEP	SUBSTEP	TASK DESCRIPTION
1	1	1	1

INPUT	ACTION	OUTPUT
Division of multiplication problems to be solved on a calculator v11		

1. TASK ANALYSIS

INPUT	ACTION	OUTPUT
Division whole numbers with remainders v11.1		
Division whole numbers without remainders v11.2		
Division decimal numbers with remainders v11.3		
Multiplication Simple v11.4		
Multiplication Accumulative v11.5		
Multiplication Three factors v11.6		

Form A-5 (5)

NO. AREA	TOPIC	SUB TOPIC	BEHAVIOR	TASK DESCRIPTION
1	1	1	1	1

INPUT	ACTION	OUTPUT
Inductive task 1		

1. TASK ANALYSIS

INPUT	ACTION	OUTPUT
Inductive task 1.1		
Inductive task 1.2		

FOLD BACK PAGE B-47

B-49

DO NEXT PROBLEM

EXERCISE 6B

In this exercise your task is to complete a task analysis diagram on FORM A.5(4) for Sub-STEP C.2.1, which is recorded on FORM A.5(3) below. You can obtain the information for the task analysis from interview results which appear on the next page.

Be sure to transcribe any needed information from FORM A.5(3) below to the blank FORM A.5(4) on page B-52a.

Form A-5 (3)

for TASK C STEP 2

SUMMARY OF Sub-STEPS

	INPUT	ACTION	OUTPUT
	Subtraction problems involving fractions of <u>less than one</u>	Perform operation to determine difference	Difference between two fractions
C.2.1	Subtraction problem consisting of fractions less than one i	Identify the relationship between denominators in the subtrahend and minuend ii	Identification of like or unlike denominators iii
C.2.2	Subtraction problems either with like or unlike denominators iv	Find difference and express it in lowest terms v	Difference in lowest terms vi

FOLD OUT THIS PAGE

B-50/
B-51

EXERCISE 6B

Read the results of the interview and then fill in the diagram on the adjacent page.

Training Analyst: Let's get your details about Sub-STEP #1. When you are teaching children to subtract fractions, what are the different kinds of problems with fractions of less than one that require you to subtract in a different way?

Informant: There are only two types of problems. The simple kind like $\frac{3}{4}$ minus $\frac{1}{4}$ where the denominators are the same, and the kind which have different denominators, such as $\frac{3}{4}$ minus $\frac{1}{3}$.

Form A 5 (4)

for TASK

STEP

Sub-STEP

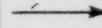
a.

TASK DESCRIPTION

INPUT



ACTION



OUTPUT

b. TASK ANALYSIS

SEE ANSWERS

ANSWERS

for TASK

C

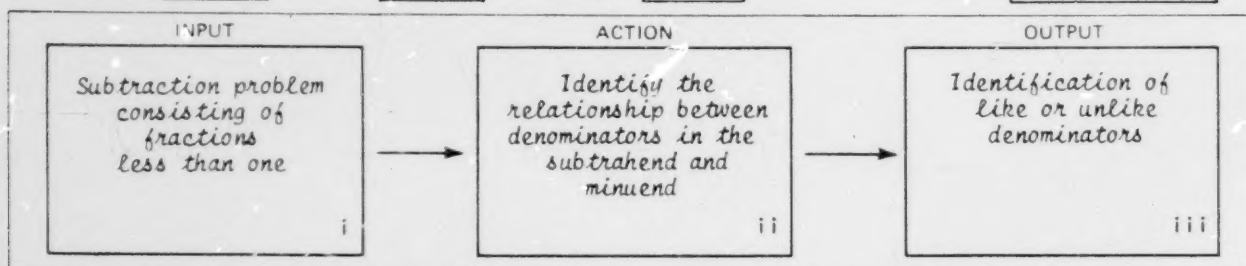
STEP

2

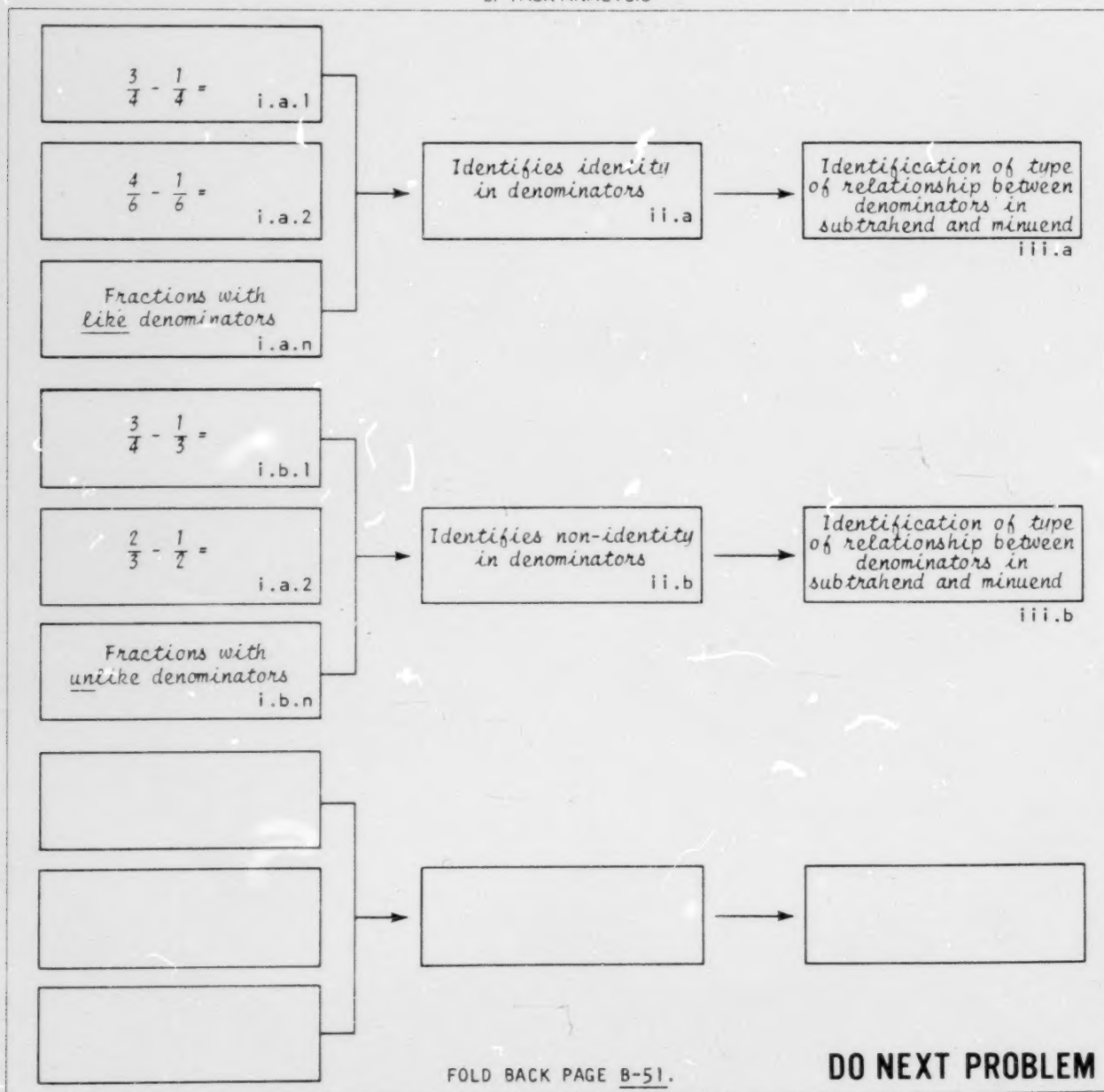
Sub-STEP

1

a. TASK DESCRIPTION



b. TASK ANALYSIS



FOLD BACK PAGE B-51.

DO NEXT PROBLEM

EXERCISE 6C

In this exercise your task is to fill in a task analysis diagram on FORM A.5(11) for Sub-Topic A.4.2, which is recorded on FORM A.5(10) below. You can obtain the information for the task analysis from the interview results which appear on page B-56.

Form A.5(10)

For AREA **A**

TOPIC **4**

Sub-TOPIC **2**

FOUR COMPETENCY LEVELS

IV	INPUT TRANSFER + ACTION TRANSFER	
	new example of input class → new example of action/chain class ←	
III	INPUT TRANSFER + ACTION RECALL	When presented with a mineral (not used in instruction), the student will name the type of mineral and state the attributes of that mineral.
	new example of input class → specific ← action/chain	
	INPUT RECALL + ACTION TRANSFER	
	→ new example of	

FOLD OUT THIS PAGE

B-54/
B-55

SECTION 6C

Read the interview results below, and then fill in both Section (a) task description and Section (b) task analysis on the form on the adjacent page.

Training Analyst: Now we want to get specific details about the content and terminal behavior expected for each concept you just identified.

Let's take minerals. What will the learner be given when you test him?

Informant: I have samples of minerals which I show the students. They have to label each mineral as either "silicious," "non-metallic," or "metallic," and state the attributes of the mineral that qualify it for that label.

Training Analyst: Let's take the samples of minerals. What are the types of minerals which the learner must classify as silicious?

Informant: That's a very large group containing about twenty-five of the earth's minerals. Some common ones are quartz, feldspar, mica, and olivine.

Training Analyst: What are the types of minerals which the learner must classify as non-metallic?

Informant: Well known examples of this group are calcite, dolomite, sulfur, rock salt, gypsum, and graphite. There are many more.

Training Analyst: What are the types of minerals which the learner must classify as metal ore minerals?

Informant: Such metals as gold, silver, iron, copper, and lead are found in the minerals of this large group.

for AREA

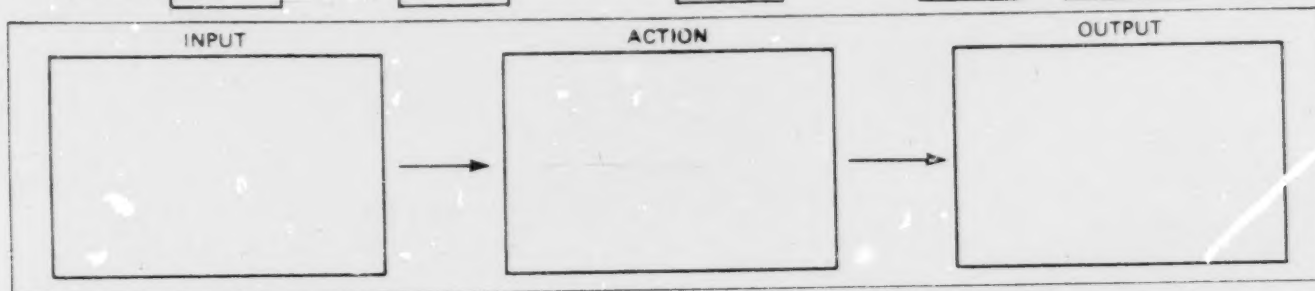
TOPIC

Sub-TOPIC

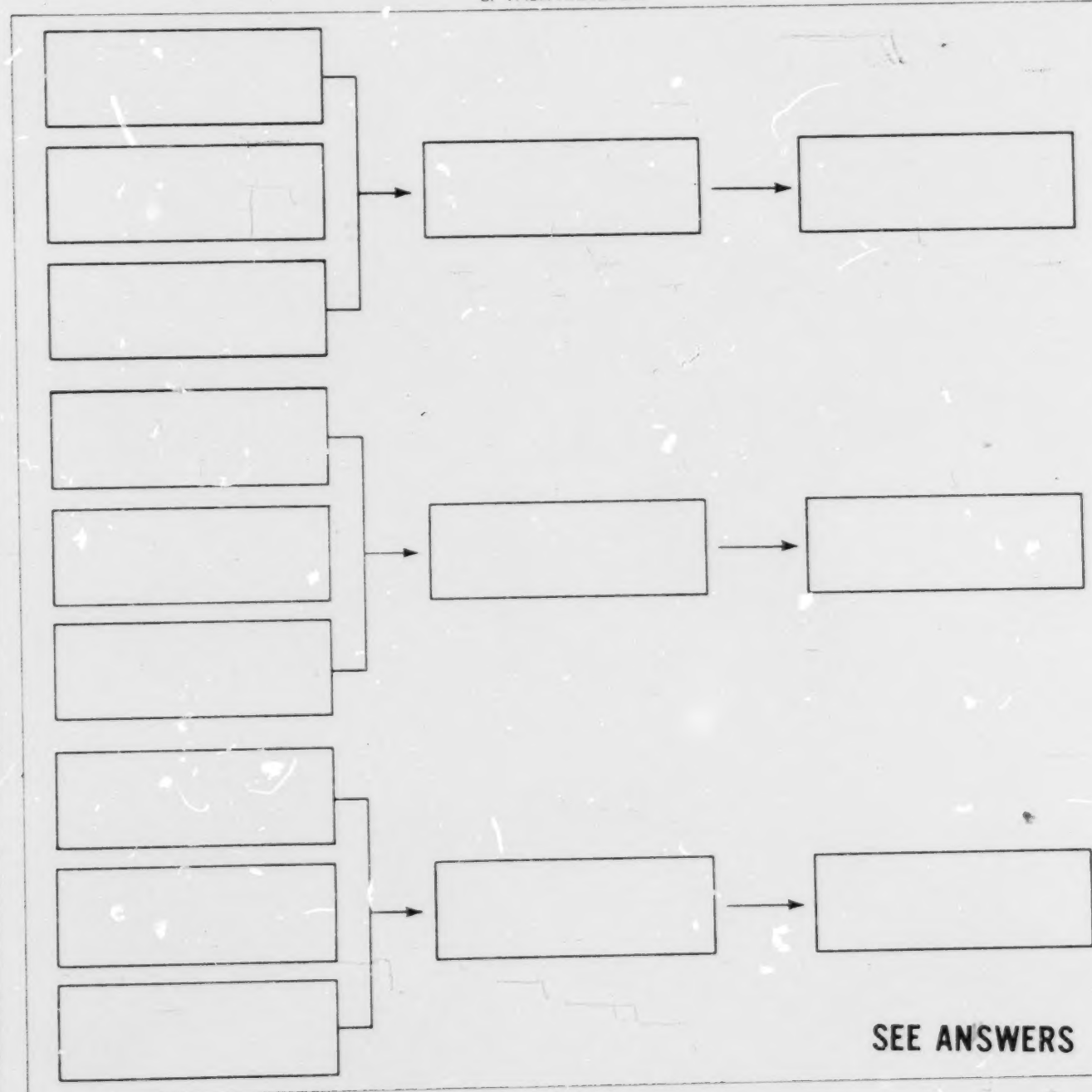
BEHAVIOR

a.

TASK DESCRIPTION



b. TASK ANALYSIS



SEE ANSWERS

ANSWERS

for AREA

A

TOPIC

1

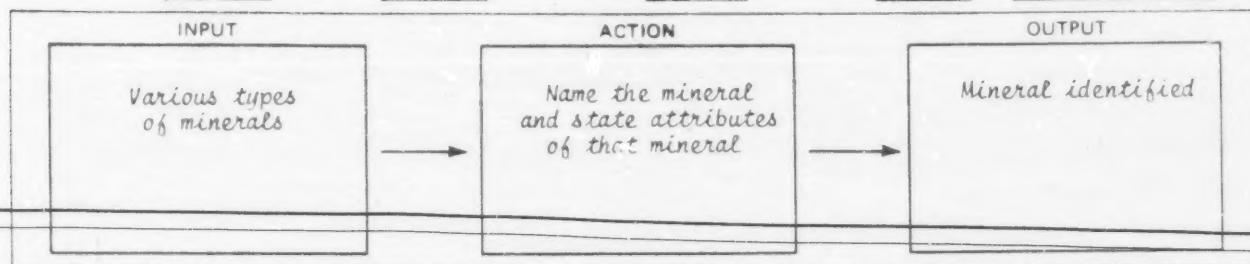
Sub-TOPIC

5

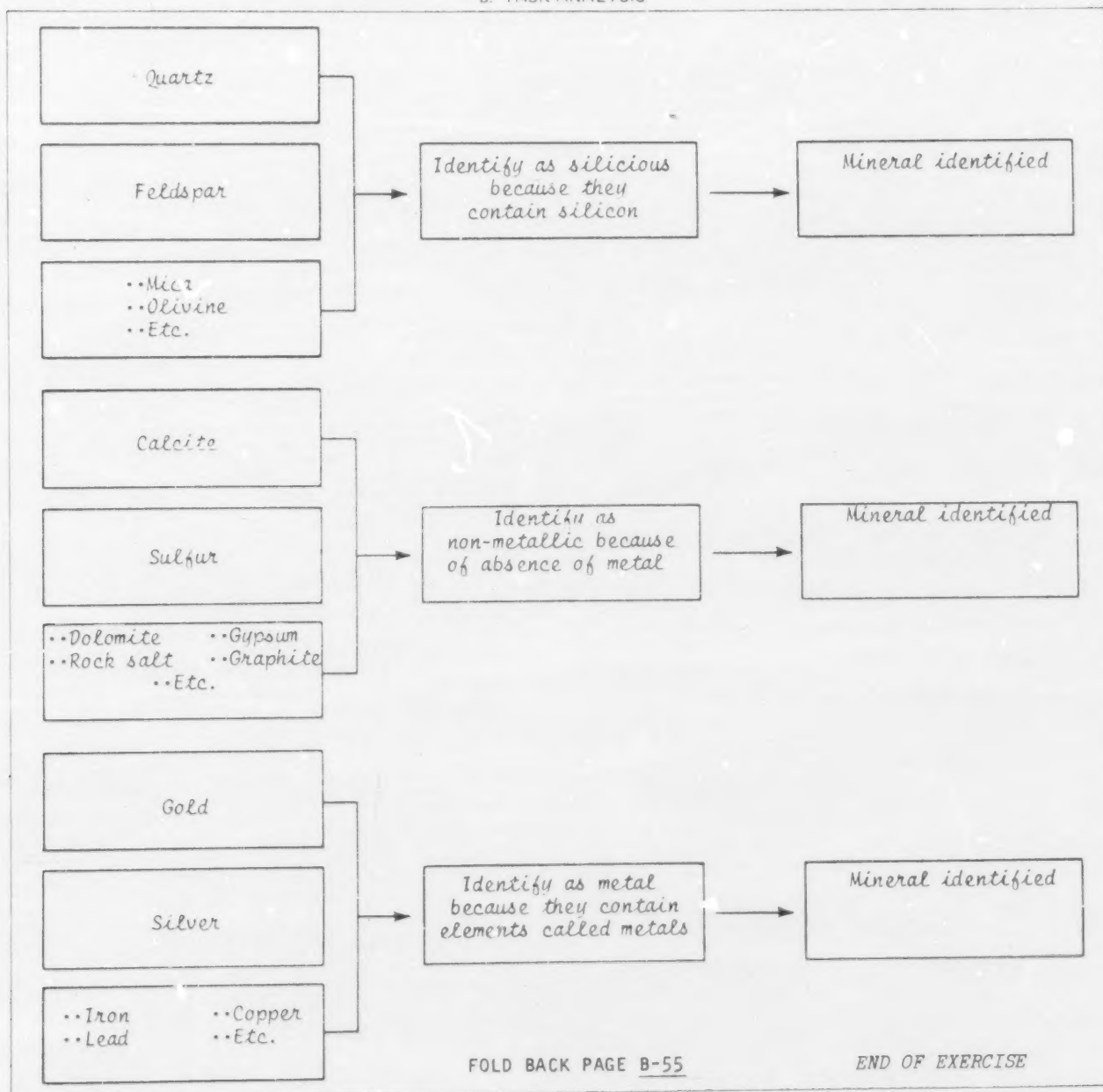
BEHAVIOR

1

a. TASK DESCRIPTION



b. TASK ANALYSIS



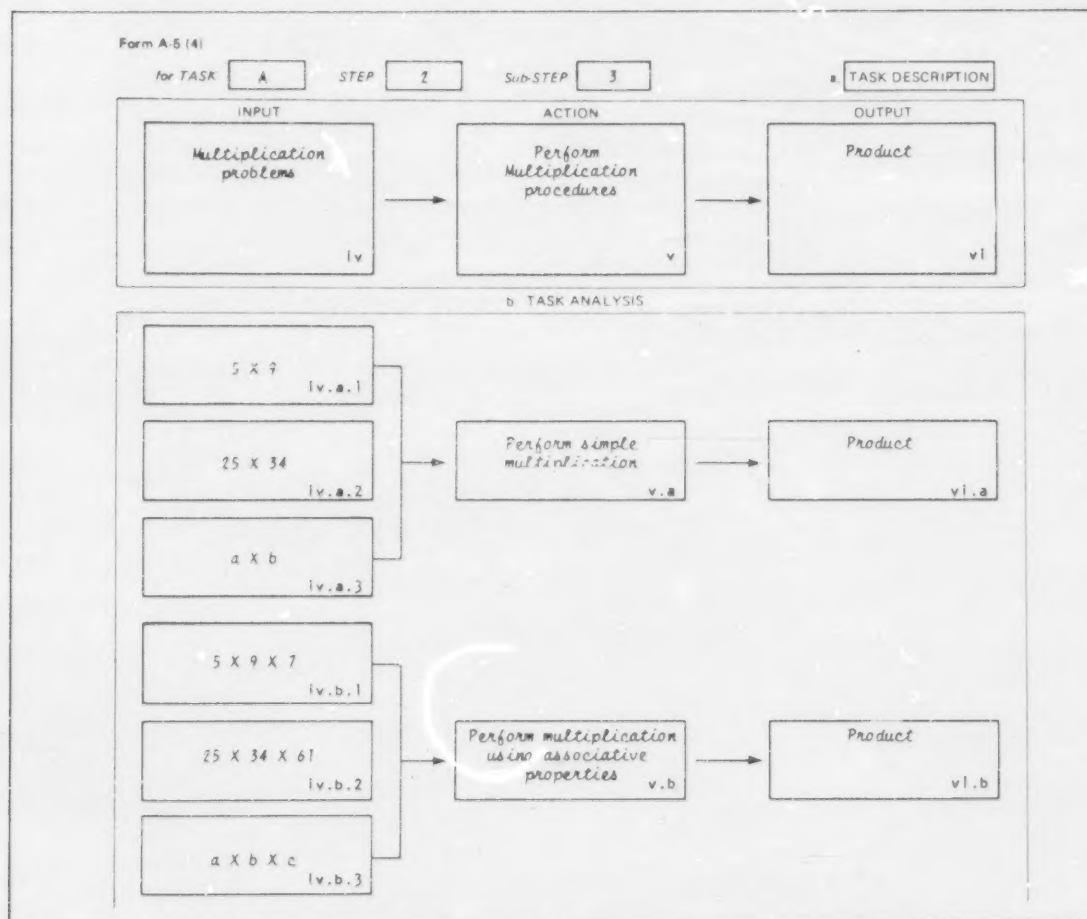
FOLD BACK PAGE B-55

END OF EXERCISE

This exercise is designed to give you practice in getting more detailed task analysis information when needed.

In the example below the technologist has determined that the target learner population is not able to perform simple multiplication. Upon further questioning of the informant, the technologist is told that in order to perform simple multiplication the student has to discriminate between three classes of situations (and generalize within them); i.e., multiplication involving: (a) only one digit numbers; (b) a mixture of two and one digit numbers; and (c) a mixture of three, two, and one digit numbers.

Diagram this lower level analysis on the next page.



for TASK

STEP

Sub-STEP

a.

TASK DESCRIPTION

INPUT	ACTION	OUTPUT
	→	

b. TASK ANALYSIS

	→		→	
	→		→	
	→		→	

SEE ANSWERS

Form A 5 (4)

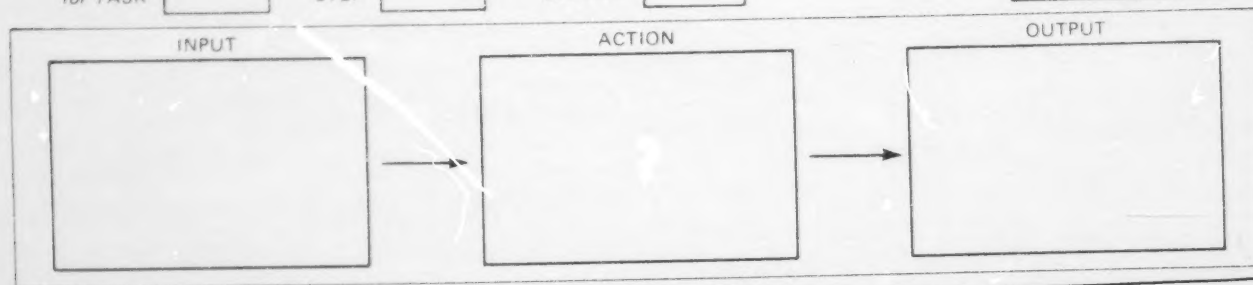
ANSWERS

for TASK

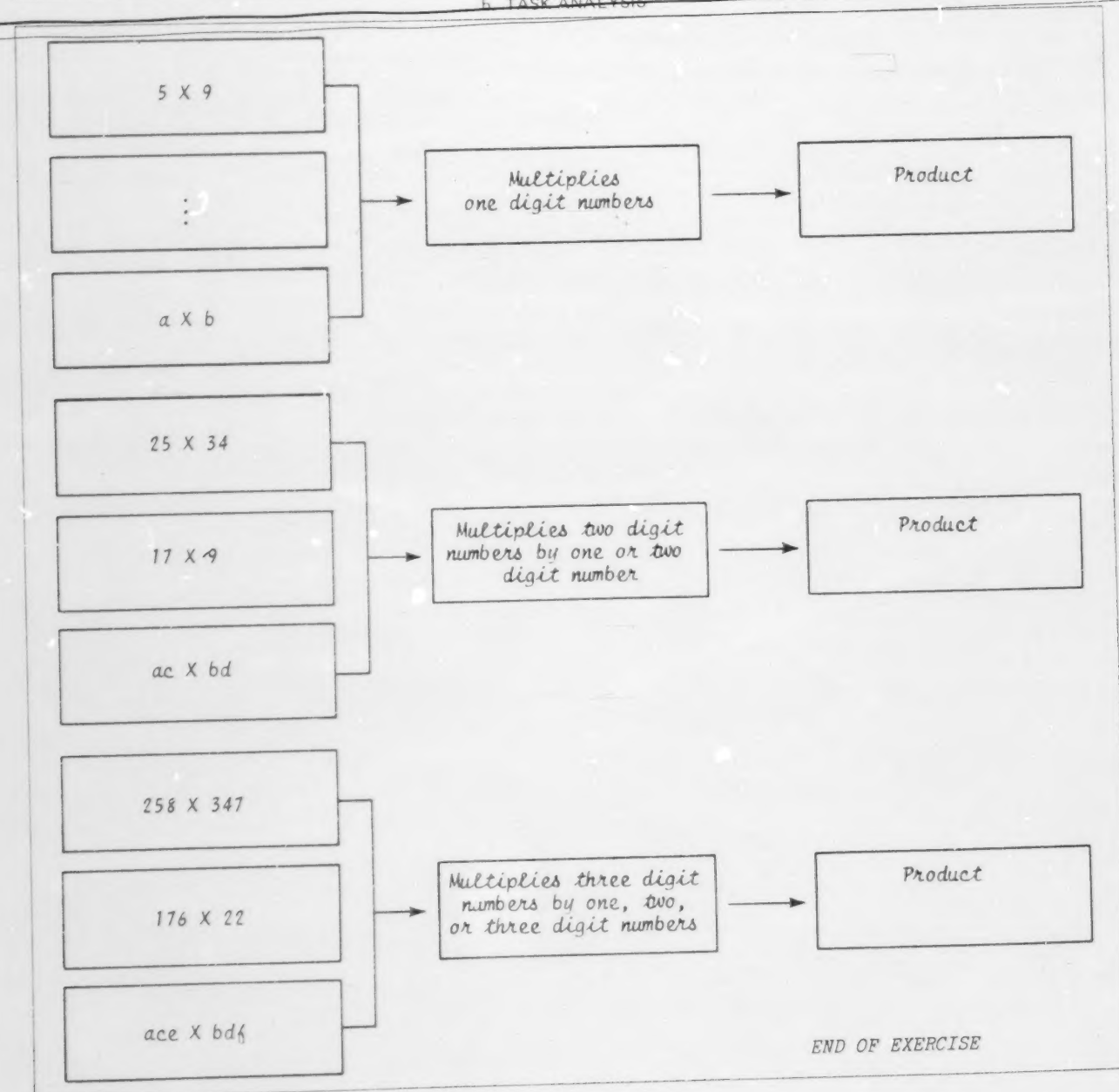
STEP

Sub-STEP

a. TASK DESCRIPTION



b. TASK ANALYSIS



END OF EXERCISE

Exercises 8A-8E are all designed to give you practice in performing learning analyses. Your task will be to make judgments about the difficulties learners are likely to experience in acquiring the component skills: discriminations, generalizations, associations, and chains.

TURN TO NEXT PAGE
FOR PROBLEMS

EXERCISE 8A

For each problem put an X through the situation in which learning to discriminate among INPUTS is likely to be more difficult. In the last column, tell why.

	SITUATION #1	SITUATION #2	WHY?	
1.	A teacher has to rank the essays of <u>five</u> students	A teacher has to rank the essays of <u>fifteen</u> students		
2.	A teacher has to rank essays on the basis of: content, organization, syntax, and interest level of writing	A teacher has to rank essays on the basis of: organization		
3.	Automobile parts are being produced 1/64 of an inch off a standard	Automobile parts are being produced 1/100 of an inch off a standard		
4.	Having to select the <u>low</u> intensity blue, given a <u>low</u> intensity and a <u>high</u> intensity blue	Having to select the <u>lowest</u> intensity blue, given two <u>low</u> intensity blues of <u>almost</u> equal intensity		
5.	Distinguishing such <u>mammals</u> as horses, cows, and pigs from such <u>reptiles</u> as snakes and alligators	Distinguishing such <u>mammals</u> as whales and porpoises from such <u>reptiles</u> as crocodiles and alligators		

SEE ANSWERS

ANSWERS

EXERCISE 8A

For each problem put an X through the situation in which learning to discriminate among INPUTS is likely to be more difficult. In the last column, tell why.

SITUATION #1

1. A teacher has to rank the essays of five students

2. A teacher has to rank essays on the basis of: content, organization, syntax, and interest level of writing

3. Automobile parts are being produced 1/64 of an inch off a standard

4. Having to select the low intensity blue, given a low intensity and a high intensity blue

5. Distinguishing such mammals as horses, cows, and pigs from such reptiles as snakes and amphibians

SITUATION #2

A teacher has to rank the essays of fifteen students

A teacher has to rank essays on the basis of: organization

Automobile parts are being produced 1/100 of an inch off a standard

Having to select the lowest intensity blue, given two low intensity blues of almost equal intensity

Distinguishing such mammals as whales and porpoises from such reptiles as crocodiles and alligators

WHY?

Having to rank more essays makes seeing the differences among them harder

The more attributes to attend to, the harder the discrimination

The smaller the deviation from the standard, the harder the discrimination

The more similar the intensities, the harder it is to tell them apart

In #2 they all live in water (have similarities) and therefore can become more easily confused

DO NEXT PROBLEM

EXERCISE 8B

For each problem put an X through the situation in which learning to generalize across INPUTS is likely to be more difficult. In the last column, tell why.

	SITUATION #1	SITUATION #2	WHY?
1.	Categorizing as blue a range of blues varying only in intensity	Categorizing as <u>blue</u> a range of blues varying in mixture with other colors (i.e. gray blues, green blues, purplish blues)	
2.	Identify horses, pigs, cows, porpoises, and whales as <u>mammals</u>	Identify snakes, lizards, and chameleons as <u>reptiles</u>	
3.	Classifying <u>three</u> varieties of rock as <u>quartz</u>	Classifying <u>twenty-two</u> varieties of rock as <u>quartz</u>	
4.	Matching five tenors for a chorus based on: intonation, tone quality, <u>and</u> phrasing	Matching five tenors for a chorus based on: phrasing	
5.	Use spray paint to paint under: <u>shutters</u> , <u>rotan</u> furniture, and picket fences	Use latex house paint on: clapboard, wood shingle, and asbestos shingle	

SEE ANSWERS

ANSWERS

EXERCISE 8B

For each problem put an X through the situation in which learning to generalize across INPUTS is likely to be more difficult. In the last column, tell why.

SITUATION #1	SITUATION #2	WHY?
1. Categorizing as <u>blue</u> a range of blues varying <u>only</u> in intensity	~~Categorizing as <u>blue</u> a range of blues varying in mixture with other colors (i.e., gray blues, green blues, purplish blues)~~	<i>The greater apparent dissimilarity makes it harder to see the similarity among greenish and other types of blues</i>
2. Identify horses, pigs, cows, porpoises, and whales as <u>mammals</u>	Identify snakes, lizards, and chameleons as <u>reptiles</u>	<i>Whales and porpoises bear a surface dissimilarity to horses, pigs, and cows</i>
3. Classifying three varieties of rock as <u>quartz</u>	~~Classifying twenty-two varieties of rock as <u>quartz</u>~~	<i>Harder to see a large number of varieties as belonging to the same class</i>
4. Matching five tenors for a chorus based on: intonation, tone quality, <u>and</u> phrasing	Matching five tenors for a chorus based on: phrasing	<i>More difficult to keep several properties in mind</i>
5. Use <u>spray</u> paint to paint under: <u>shutters</u> , <u>rattan</u> furniture, <u>and</u> <u>picket</u> fences	Use latex house paint on: <u>clapboard</u> , <u>wood shingle</u> , and <u>asbestos shingle</u>	<i>The greater apparent dissimilarity makes it harder to see their similarity</i>

DO NEXT PROBLEM

EXERCISE 8C

For each problem put an X through the situation in which learning to associate or to chain INPUTS and ACTIONS is likely to be more difficult. In the last column, tell why.

	SITUATION #1	SITUATION #2	WHY?
1.	Threading an open-reel tape recorder	Inserting a tape cassette in a cassette deck	
2.	Associating twenty labels with twenty styles of painting	Associating five labels with five styles of painting	
3.	Teacher has to associate ten faces and ten names	Teacher has to associate twenty-five faces and twenty-five names	
4.	Taking apart a TV set, piece by piece, replacing faulty component, and assembling	Replacing intact modules in a TV set	
5.	Mechanic has to associate ten different types of pliers with ten different uses	Mechanic has to associate two types of wrenches with their uses	

SEE ANSWERS

ANSWERS

EXERCISE 8C

For each problem put an X through the situation in which learning to associate or chain INPUTS and ACTIONS is likely to be more difficult. In the last column, tell why.

	SITUATION #1	SITUATION #2	WHY?
1.	~~Threading an open-reel tape recorder~~	Inserting a tape cassette in a cassette deck	There are more steps to be learned in the sequence
2.	~~Associating twenty labels with twenty styles of painting~~	Associating five labels with five styles of painting	It is harder to learn to associate twenty labels than five
3.	Teacher has to associate ten faces and ten names	~~Teacher has to associate twenty-five faces and twenty-five names~~	The larger the number of associations, the harder it is to learn
4.	~~Taking apart a TV set, piece by piece, replacing faulty component, and assembling~~	Replacing intact modules in a TV set	There are more steps to be learned in the sequence
5.	~~Mechanic has to associate ten different types of pliers with ten different uses~~	Mechanic has to associate two types of wrenches with their uses	It is harder to learn a large number of associations

DO NEXT PROBLEM

EXERCISE 8D

For each example below, put an X through the ACTION generalization which is likely to be more difficult.

Background of Performer	ACTION Generalization #1	ACTION Generalization #2
1. Students in beginning French have had practice in recognizing (selecting from options) which of two pronunciations is the better (for a series of words)	In a new practice or test situation, they are given examples of the same words (one at a time) and asked to correct each word--if the pronunciation is wrong	In a new practice or test situation, they are given examples of the same words (one at a time) and asked to indicate if they are right or wrong
2. A training specialist has had prior experience in writing textbooks in physics	He has to prepare a programmed, verbal text on "heat and energy"	He has to prepare a programmed film, using primarily visual examples, on "heat and energy"
3. A student who has completed only an introductory course in statistics	On a test he is required to select and use any one of several <u>equally</u> applicable techniques: (1) t-test for difference between means; (2) t-test for mean differences; (3) F-test	On a test he is required to select and use any one of several <u>equally</u> applicable techniques: (1) t-test for difference between means; (2) t-test for mean differences
4. Elementary grade students who are in a beginner's course in sex education; they have practiced labeling and defining elements of the reproductive system	On a test they are required to state in their own words and compare and contrast the functions served by elements of the reproductive system	On a test they are required to give examples of comparable elements in animals
5. English students in high school have had considerable experience editing paragraphs	On a test they are required to state verbally what is wrong with paragraphs and to indicate what needs to be done	On a test they are required to produce original paragraphs (which are acceptable with respect to the problems they have been previously dealing with)

SEE ANSWERS

ANSWERS

EXERCISE 8D

For each example below, put an X through the ACTION generalization which is likely to be more difficult.

Background of Performer		ACTION Generalization #1		ACTION Generalization #2	
1.	Students in beginning French have had practice in recognizing (selecting from options) which of two pronunciations is the better (for a series of words)	~~In a new practice or test situation, they are given examples of the same words (one at a time) and asked to correct each word--if the pronunciation is wrong~~		In a new practice or test situation, they are given examples of the same words (one at a time) and asked to indicate if they are right or wrong	
2.	A training specialist has had prior experience in writing textbooks in physics	He has to prepare a programmed, verbal text on "heat and energy"		~~He has to prepare a programmed film, using primarily visual examples, on "heat and energy"~~	
3.	A student who has completed only an introductory course in statistics	~~On a test he is required to select and use any one of several equally applicable techniques: (1) t-test for difference between means; (2) t-test for mean differences; (3) F-test~~		On a test he is required to select and use any one of several equally applicable techniques: (1) t-test for difference between means; (2) t-test for mean differences	
4.	Elementary grade students who are in a beginner's course in sex education; they have practiced labeling and defining elements of the reproductive system	~~On a test they are required to state in their own words and compare and contrast the functions served by elements of the reproductive system~~		On a test they are required to give examples of comparable elements in animals	
5.	English students in high school have had considerable experience editing paragraphs	On a test they are required to state verbally what is wrong with paragraphs and to indicate what needs to be done		~~On a test they are required to produce original paragraphs (which are acceptable with respect to the problems they have been previously dealing with)~~	

DO NEXT PROBLEM

EXERCISE 8E

This exercise is designed to give you practice in performing a learning analysis.

Your task is to review the task analysis results presented below on FORM A.5(4) and the results of an interview presented on the next page. Then, on the basis of both sets of results, put X's in the appropriate boxes on the learning analysis form appearing on page B-74a.

Form A.5(4)

for TASK

A

STEP

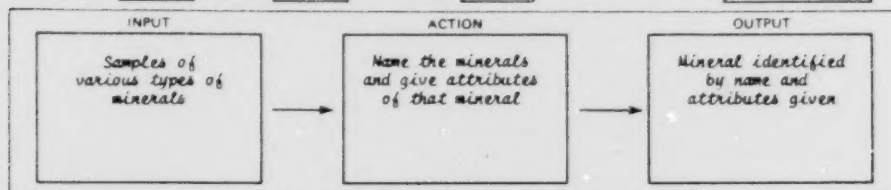
1

SUB-STEP

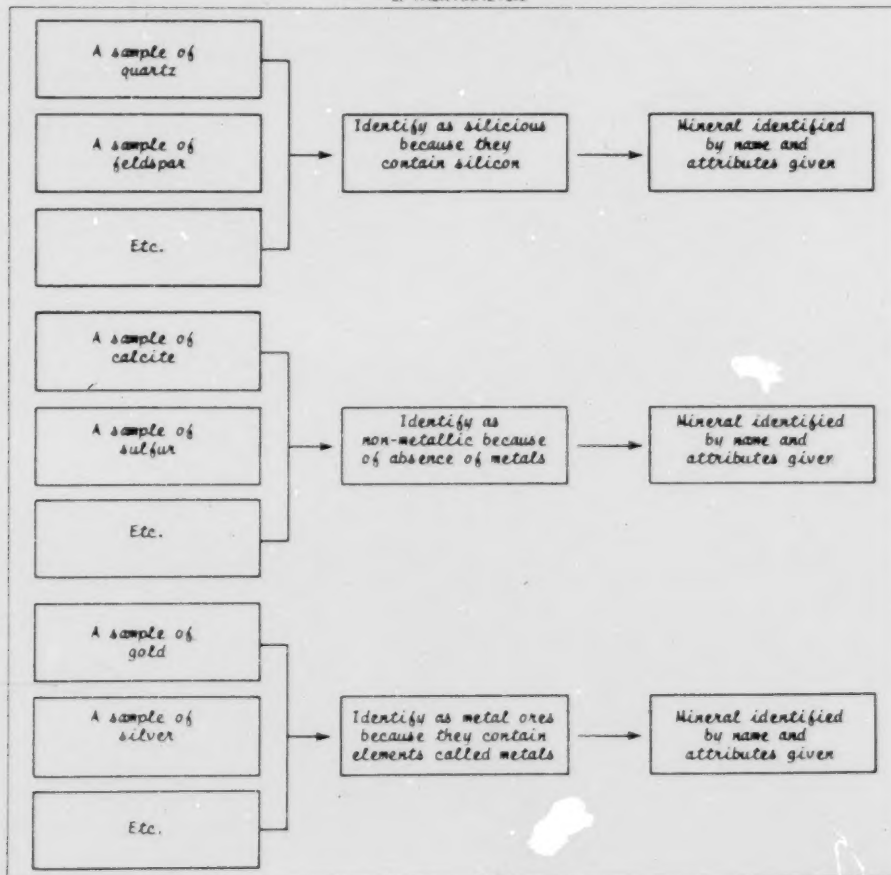
5

a

TASK DESCRIPTION



b. TASK ANALYSIS



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INTERVIEW RESULTS

Re: INPUTS

Discriminations: Geologists classify minerals into groups, depending upon the kinds of chemicals in them and also the structure of the crystals they form. Most rocks are made up of more than one mineral; and there are hundreds of different kinds of minerals which are classified into four groups. Some minerals in the non-metallic group are difficult to tell from the metallic group because they contain chemical elements, such as calcium or magnesium, which chemists call metals.

Generalizations: The number of minerals within each class are numerous. For example, the silicious minerals contain about 25 percent of all the known minerals on earth, and some are seemingly quite dissimilar, despite the essential similarity in crystal structure and chemical content.

Re: ACTIONS

This is a new action to be learned (i.e., correctly labeling minerals). It has never been performed before nor have the students performed other similar actions. (Inspect diagram on preceding page for determining difficulty levels for chains.)

Re: OUTPUTS

The output is the mineral correctly identified by name.

c. LEARNING ANALYSIS

level of difficulty in acquiring →

DISCRIMINATIONS

due to ▽ similarity	hi	med	lo
No. of properties			
No. of inputs			

GENERALIZATIONS

	hi	med	lo
dissimilarity			
No. of properties			
No. of inputs			

ASSOCIATIONS

due to ▽ No. of associations	hi	med	lo
associative strength of other actions			

GENERALIZATIONS

	hi	med	lo
integrative strength of action			

CHAINS

	hi	med	lo
length of chain			
output discrimination problems			
associative strength of other actions			

DISCRIMINATIONS

due to ▽ similarity	hi	med	lo
No. of properties			
No. of inputs			

GENERALIZATIONS

	hi	med	lo
dissimilarity			
No. of properties			
No. of inputs			

SEE ANSWERS

ANSWERS

c. LEARNING ANALYSIS

level of difficulty in acquiring →

DISCRIMINATIONS

due to ▽ similarity	hi	med	lo
	X		
No. of properties			X
No. of inputs			X

GENERALIZATIONS

	hi	med	lo
dissimilarity	X		
No. of properties			X
No. of inputs	X		

ASSOCIATIONS

due to ▽	hi	med	lo
No. of associations			X
associative strength of other actions			X

GENERALIZATIONS

	hi	med	lo
integrative strength of action			

CHAINS

	hi	med	lo
length of chain			X
output discrimination problems			X
associative strength of other actions			X

DISCRIMINATIONS

due to ▽ similarity	hi	med	lo
			X
No. of properties			X
No. of inputs			X

GENERALIZATIONS

	hi	med	lo
dissimilarity			X
No. of properties			X
No. of inputs			X

FOLD BACK
PAGE B-73

END OF EXERCISE

After reading
Handbook for
sub-STEP(S)

B.4.5

DO
EXERCISE

9

This exercise is designed to give you practice performing a competency analysis.

FOLD OUT THIS PAGE

B-76/
B-77

EXERCISE 9

Your job task is first to inspect the task analysis results below and the learning analysis results on the adjacent page.

Then, based on these results, decide whether there is likely to be recall or transfer requirements.

Indicate your decision by putting an X in either the recall or transfer boxes for INPUTS, ACTIONS, and OUTPUTS.

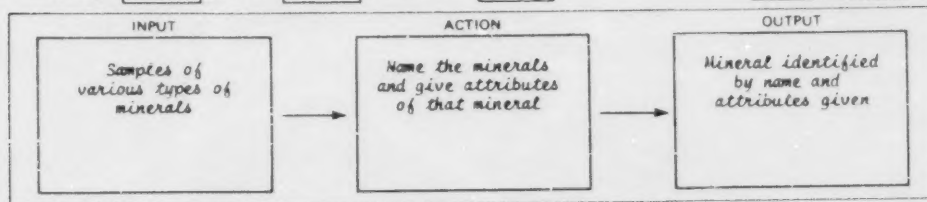
Form A-6 (4)

for TASK **A**

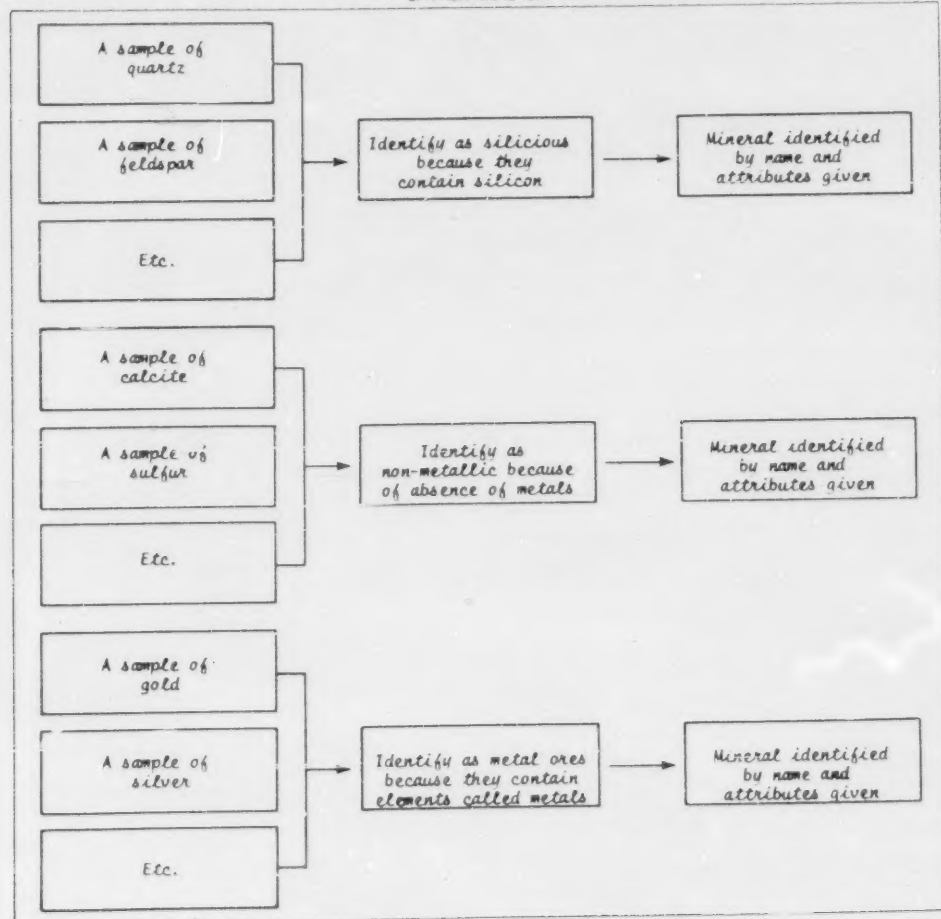
STEP **1**

Sub-STEP **5**

a. TASK DESCRIPTION



b. TASK ANALYSIS



COMPETENCY ANALYSIS ▽	c. LEARNING ANALYSIS level of difficulty in acquiring →	d. MODE ANALYSIS																																								
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ANSWERS

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Exercises 10A and 10B are designed to give you practice identifying the different types of INPUT, ACTION, and OUTPUT modes.

TURN TO NEXT PAGE FOR PROBLEMS

EXERCISE 10A

For each example below put an X in the appropriate cell identifying the MODE of the INPUT or OUTPUT described in the problem.

1. Bar chart showing net corporate earnings for each month in a 12 month period.

The mode of this INPUT is:

		SYMBOLIC	VERBAL	OTHER
VISUAL	high-tech			
	non-reduced			
	low-reduced			
AUDIO	high-tech			
	non-reduced			
	low-reduced			
OTHER		K. non-reduced, other, other		

2. Student tunes his guitar to the sound of a note on a pitch pipe.

The mode of this INPUT is:

		SYMBOLIC	VERBAL	OTHER
VISUAL	high-tech			
	non-reduced			
	low-reduced			
AUDIO	high-tech			
	non-reduced			
	low-reduced			
OTHER		K. non-reduced, other, other		

3. Student must identify mineral from drawing representing crystal formation.

The mode of the INPUT is:

		SYMBOLIC	VERBAL	OTHER
VISUAL	high-tech			
	non-reduced			
	low-reduced			
AUDIO	high-tech			
	non-reduced			
	low-reduced			
OTHER		K. non-reduced, other, other		

4. During a singing lesson, student is given sheet music and must sing from it.

The mode of the INPUT is:

		SYMBOLIC	VERBAL	OTHER
VISUAL	high-tech			
	non-reduced			
	low-reduced			
AUDIO	high-tech			
	non-reduced			
	low-reduced			
OTHER		K. non-reduced, other, other		

SEE ANSWERS

ANSWERS

EXERCISE 10A

For each example below put an X in the appropriate cell identifying the MODE of the INPUT or OUTPUT described in the problem.

1. Bar chart showing net corporate earnings for each month in a 12 month period.

The mode of this INPUT is:

		MODE ANALYSIS		
		numerical	verbal	nonverbal
VISUAL	numerical			
	nonverbal	X		
AUDIO	numerical			
	nonverbal			
OTHER		numerical, verbal, nonverbal		

2. Student tunes his guitar to the sound of a note on a pitch pipe.

The mode of this INPUT is:

		MODE ANALYSIS		
		numerical	verbal	nonverbal
VISUAL	numerical			
	nonverbal			
AUDIO	numerical	X		
	nonverbal			
OTHER		numerical, verbal, nonverbal		

3. Student must identify mineral from drawing representing crystal formation.

The mode of the INPUT is:

		MODE ANALYSIS		
		numerical	verbal	nonverbal
VISUAL	numerical			
	nonverbal			X
AUDIO	numerical			
	nonverbal			
OTHER		numerical, verbal, nonverbal		

4. During a singing lesson, student is given sheet music and must sing from it.

The mode of the INPUT is:

		MODE ANALYSIS		
		numerical	verbal	nonverbal
VISUAL	numerical			
	nonverbal	X		
AUDIO	numerical			
	nonverbal			
OTHER		numerical, verbal, nonverbal		

DO NEXT PROBLEM

EXERCISE 10A

(Continued)

5. Student decodes Morse Code by writing translation on paper.

The mode of the OUTPUT is:

		TO PRESENT	VERBAL	AUDIO/VIDEO
VISUAL	NOT USED			
	NOT REDUCED TOLERANCE			
AUDIO	NOT USED			
	NOT REDUCED TOLERANCE			
OTHER R. K. REDUCED T. AUDIO/VIDEO				

6. A student records a lecture given by instructor.

The mode of the OUTPUT is:

		TO PRESENT	VERBAL	AUDIO/VIDEO
VISUAL	NOT USED			
	NOT REDUCED TOLERANCE			
AUDIO	NOT USED			
	NOT REDUCED TOLERANCE			
OTHER R. K. REDUCED T. AUDIO/VIDEO				

7. Students in audiovisual course produce a video tape.

The mode of the OUTPUT is:

		TO PRESENT	VERBAL	AUDIO/VIDEO
VISUAL	NOT USED			
	NOT REDUCED TOLERANCE			
AUDIO	NOT USED			
	NOT REDUCED TOLERANCE			
OTHER R. K. REDUCED T. AUDIO/VIDEO				

8. Sign painter produces narrowing lines for highway signs indicating the highway is going from 4 to 2 lanes.

The mode of this OUTPUT is:

		TO PRESENT	VERBAL	AUDIO/VIDEO
VISUAL	NOT USED			
	NOT REDUCED TOLERANCE			
AUDIO	NOT USED			
	NOT REDUCED TOLERANCE			
OTHER R. K. REDUCED T. AUDIO/VIDEO				

SEE ANSWERS

ANSWERS

EXERCISE 10A

(Continued)

5. Student decodes Morse Code by writing translation on paper.

The mode of the OUTPUT is:

MODE ANALYSIS			
	Visual	Audio	Other
Visual			X
Audio			
Other			

6. A student records a lecture given by instructor.

The mode of the OUTPUT is:

MODE ANALYSIS			
	Visual	Audio	Other
Visual			
Audio			X
Other			

7. Students in audiovisual course produce a video tape.

The mode of the OUTPUT is:

MODE ANALYSIS			
	Visual	Audio	Other
Visual			X
Audio			
Other			

8. Sign painter produces narrowing lines for highway signs indicating the highway is going from 4 to 2 lanes.

The mode of this OUTPUT is:

MODE ANALYSIS			
	Visual	Audio	Other
Visual	X		
Audio			
Other			

DO NEXT PROBLEM

EXERCISE 10B

Put an X in the appropriate cell indicating the mode of the ACTIONS described in the problems.

1. Statistician draws graph plotting income by years.

	perceptual	motor	voice	sub-voice
recognition				
editing				
production				

2. Lab technician compares color of blood smear with that of standard sample.

	perceptual	motor	voice	sub-voice
recognition				
editing				
production				

3. Child is shown a hammer, a saw, a screwdriver, and a board. Asked which object does not belong with the others, he says, "the board."

	perceptual	motor	voice	sub-voice
recognition				
editing				
production				

4. From a temperature map of the Western Hemisphere, completes a chart by writing in information about the climate, season, and geographical factors which affect the climate for five cities.

	perceptual	motor	voice	sub-voice
recognition				
editing				
production				

SEE ANSWERS

ANSWERS

EXERCISE 108

Put an X in the appropriate cell indicating the mode of the ACTIONS described in the problems.

1. Statistician draws graph plotting income by years.

	perceptual	motor	vocal	subvocal
recognition				
editing				
production		X		

2. Lab technician compares color of blood smear with that of standard sample.

	perceptual	motor	vocal	subvocal
recognition	X			
editing				
production				

3. Child is shown a hammer, a saw, a screwdriver, and a board. Asked which object does not belong with the others. he says, "the board."

	perceptual	motor	vocal	subvocal
recognition			X	
editing				
production				

4. From a temperature map of the Western Hemisphere, completes a chart by writing in information about the climate, season, and geographical factors which affect the climate for five cities.

	perceptual	motor	vocal	subvocal
recognition				
editing				
production		X		

DO NEXT PROBLEM

EXERCISE 10B

(Continued)

5. Given examples of ordinal and cardinal numbers, the student will read them and identify for each example the type of number it is.

	perceptual	motor	vocal	sub-vocal
recognition				
editing				
production				

6. Demonstrate in order the procedures for putting a slide in place on a microscope and adjust the view.

	perceptual	motor	vocal	sub-vocal
recognition				
editing				
production				

7. A drawing of a microscope has the parts incorrectly labeled. The student must correct the labeling.

	perceptual	motor	vocal	sub-vocal
recognition				
editing				
production				

8. Given a drawing for an organism representative of a certain phylum, the student will orally name the phylum to which it belongs.

	perceptual	motor	vocal	sub-vocal
recognition				
editing				
production				

SEE ANSWERS

ANSWERS

EXERCISE 10B

(Continued)

5. Given examples of ordinal and cardinal numbers, the student will read them and identify for each example the type of number it is.

	perceptual	motor	vocal	sub-vocal
recognition				
editing				
production				X

6. Demonstrate in order the procedures for putting a slide in place on a microscope and adjust the view.

	perceptual	motor	vocal	sub-vocal
recognition				
editing				
production		X		

7. A drawing of a microscope has the parts incorrectly labeled. The student must correct the labeling.

	perceptual	motor	vocal	sub-vocal
recognition				
editing		X		
production				

8. Given a drawing for an organism representative of a certain phylum, the student will orally name the phylum to which it belongs.

	perceptual	motor	vocal	sub-vocal
recognition				
editing				
production			X	

After reading
Handbook for
sub STEP(S)

B.5.1

DO
EXERCISE

10C

This exercise is designed to give you practice classifying INPUT, ACTION, and OUTPUT modes based on the task analysis diagram.

FOLD OUT THIS PAGE

B-90/
B-91

EXERCISE 10C

Inspect the task analysis diagram below for mode of INPUTS, for mode of ACTIONS, and for mode of OUTPUTS. Record the mode analysis results by putting X's in the appropriate cells on the right-hand side of Form A.5(4).

Form A-5 (4)

for TASK

A

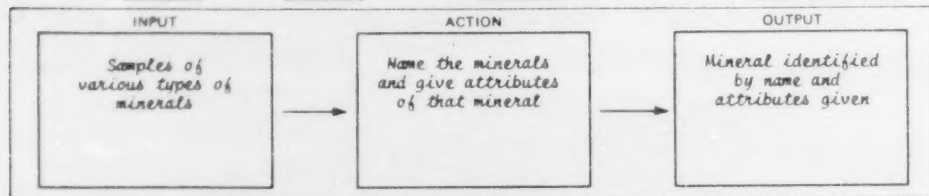
STEP

1

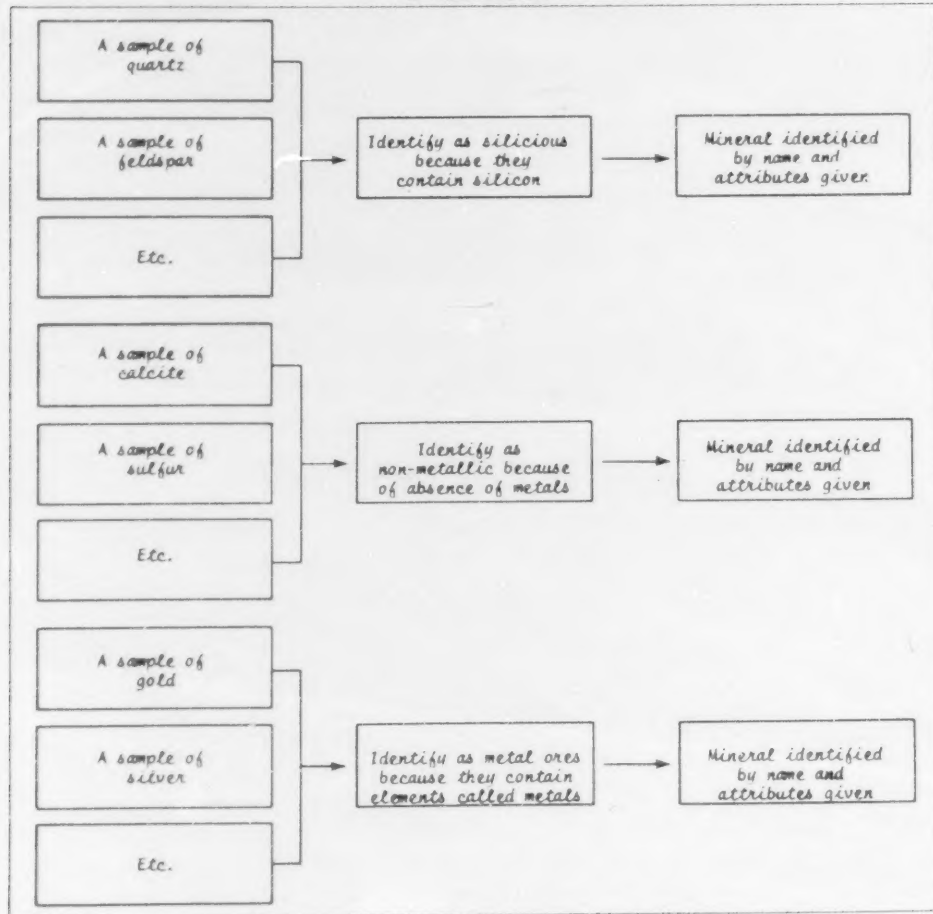
Sub-STEP

5

a TASK DESCRIPTION



b. TASK ANALYSIS



COMPETENCY ANALYSIS	c. LEARNING ANALYSIS	d. MODE ANALYSIS																																																						
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#7 and #8
WHICH APPEAR IN THE
FINAL EXERCISES VOLUME

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B-94 / B-95